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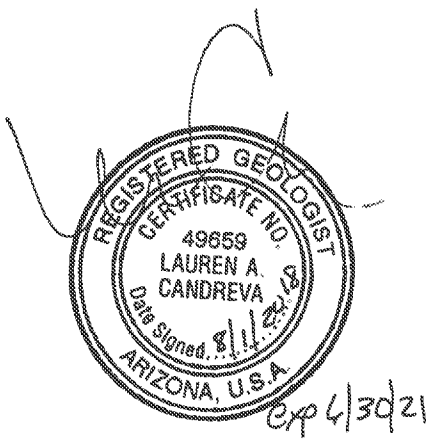
FORMATION TESTING REPORT
PRODUCTION TEST FACILITY
FLORENCE COPPER PROJECT
FLORENCE, ARIZONA

by Haley & Aldrich, Inc.
Phoenix, Arizona



for Florence Copper Inc.
Florence, Arizona

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1. Introduction

Florence Copper Inc. (Florence Copper) is in the final stages of constructing a Production Test Facility (PTF) at the Florence Copper Project (FCP) in Florence, Arizona. The purpose of the PTF is to demonstrate the feasibility of In-Situ Copper Recovery at the FCP site as a step toward commercial production at the site. The PTF is being constructed and will be operated in accordance with the United States Environmental Protection Agency (EPA) Underground Injection Control (UIC) Permit No. R9UIC-AZ3-FY11-1 (UIC Permit) and the Arizona Department of Environmental Quality (ADEQ) Temporary Aquifer Protection Permit (APP) No. P-106360.

On 22 March 2018, Florence Copper submitted the "Notification of Intent and Scope of Planned Formation Testing for the PTF Area" (the "Plan"; Florence Copper, 2018), pursuant to requirements of the UIC Permit. The Plan provided details to the EPA and ADEQ regarding the planned execution of formation testing required under Part II.A.2 of the UIC Permit and under Section 2.7.4.3 and Section 3.0 of the APP. Approval of the Plan was received from the EPA in a letter dated 3 May 2018, and via email from ADEQ on 9 May 2018 with clarification made via email communication.

This document provides a summary of the results of formation testing described in the approved Plan. The testing included pump tests conducted at each of the outermost recovery wells, pump tests conducted in upper basin fill and lower basin fill wells, and a dye tracer test. The testing results are presented below in the order that each test element was described in the Plan. The locations of each of the wells tested and monitored during the test are shown on Figure 1.

2. Field Implementation

2.1 PUMPING TESTS AT FOUR OUTERMOST RECOVERY WELLS

The APP requires that Florence Copper conduct pumping tests on each of the four outer recovery wells R-01, R-03, R-05, and R-07. In accordance with the Plan and input received from ADEQ, a step-rate test, constant-rate test, and recovery test were conducted at each of the wells. In addition, spinner-flowmeter surveys were conducted during the constant-rate test at each well.

The step-rate tests consisted of four steps sustained for a minimum of 30 minutes each followed by a constant-rate test that extended a minimum of 8 hours. The constant-rate was conducted by extending the last step of the step-rate tests. Pumping was stopped during the constant-rate tests once the drawdown at the downgradient monitoring well reached a stable drawdown rate.

During testing activities, the pumping well and monitoring wells were monitored using dedicated pressure transducers equipped with data loggers. Manual readings were also collected in the pumping and key observation wells during each test. Discharge and totalizer measurements were recorded using a digital flowmeter with instantaneous flow rate display. Discharge was adjusted as necessary to maintain a constant pumping rate using a ball valve located at the well head. Manual depth to water measurements and totalizer readings were recorded on a standardized field form for each well in the monitoring group.

Water levels in monitoring wells M54-LBF, M54-O, M55-UBF, M56-LBF, M57-O, M58-O, M59-O, M60-O, M61-LBF, MW-01-LBF, and MW-01-O (secondary monitoring wells) were monitored with dedicated transducers at a rate of one measurement per 5 minutes throughout the duration of each recovery well pumping and recovery test. Hydrographs showing drawdown at each of the secondary monitoring wells during testing activities are included in Appendix A.

Southwest Exploration LLC (SW Exploration) was contracted to conduct spinner flowmeter surveys during each constant-rate test. The spinner flowmeter tool was installed in the wells prior to the installation of the test pump to allow tool access in the well screen interval.

2.1.1 R-01 Pumping Test

Haley & Aldrich, Inc. (Haley & Aldrich) personnel conducted the pumping test of recovery well R-01 beginning on 24 May 2018. During this test, the pumping well (R-01) and nearby wells O-07, O-01, and I-01 (primary monitoring wells) were monitored with dedicated transducers at a rate of one measurement per minute.

The submersible pump used to conduct the test was installed on 23 May 2018 with the pump intake at approximately 305 feet below top of casing (btoc). Prior to the start of pumping, depth to water measurements were taken in the pumping well and three primary monitoring wells and were recorded as follows:

Well ID	Depth to Water (feet btoc)	Date/Time
R-01	232.02	5/24/2018 07:27
I-01	233.34	5/24/2018 07:29
O-01	233.73	5/24/0218 07:34
O-07	231.96	5/24/2018 07:27

The pump at R-01 was started on 24 May 2018 at 07:45. The first pumping step was conducted at an average rate of 6 gallons per minute (gpm) for 31 minutes; step 2 was conducted at an average rate of 11 gpm for 31 minutes; step 3 was conducted at an average rate of 19 gpm for 30 minutes; and, step 4 extended into the constant rate test and was conducted at an average rate of 40 gpm for 483 minutes. After 103 minutes of pumping at the constant rate, SW Exploration conducted a spinner-flowmeter survey of R-01. After 575 minutes of total pumping (including step-rate and constant-rate pumping), the pump was turned off and water level recovery monitoring commenced. Pumping was discontinued at 17:20.

After pumping was discontinued, manual depth to water measurements were recorded for the pumping and primary monitoring wells periodically for approximately 90 minutes. The aquifer was allowed to recover overnight before any further activities were conducted at the well. Following overnight recovery, on 25 May 2018, depth to water measurements of the pumping well and three primary monitoring wells were recorded as follows:

Well ID	Depth to Water (feet btoc)	Date/Time
R-01	233.46	5/25/2018 07:01
I-01	233.83	5/25/2018 08:55
O-01	234.15	5/25/2018 09:47
O-07	232.30	5/25/2018 09:43

The drawdown values observed during the R-01 pumping test and the spinner flow meter profiling results are plotted on Figures 2 and 3, respectively.

2.1.2 R-03 Pumping Test

Haley & Aldrich personnel conducted the pumping test at recovery well R-03 beginning on 22 May 2018. During this test, the pumping well (R-03) and nearby wells O-02, O-03, and I-02 (primary monitoring wells) were monitored with dedicated transducers at a rate of one measurement per minute.

The submersible pump used to conduct the test was installed on 21 May 2018 with the intake at approximately 305 feet btoc. Prior to the start of pumping, depth to water measurements were taken in the pumping well and three primary monitoring wells and were recorded as follows:

Well ID	Depth to Water (feet btoc)	Date/Time
R-03	231.85	5/22/2018 07:43
I-02	232.08	5/22/2018 07:35
O-02	231.00	5/22/2018 07:37
O-03	230.40	5/22/2018 07:30

The pump at R-03 was started on 22 May 2018 at 07:54. The first pumping step was conducted at an average rate of 6 gpm for 32 minutes; step 2 was conducted at an average rate of 8 gpm for 31 minutes; step 3 was conducted at an average rate of 22 gpm for 31 minutes; and, step 4 extended into the constant-rate test and was conducted at an average rate of 41 gpm for 481 minutes. After approximately 90 minutes of pumping at the constant-rate, SW Exploration conducted a spinner-flowmeter survey of R-03. After 575 minutes of total pumping (including step-rate and constant-rate pumping), the pump was turned off and water level recovery monitoring commenced. Pumping was discontinued at 17:29.

After pumping was discontinued, manual depth to water measurements were recorded for the pumping and primary monitoring wells periodically for approximately 90 minutes. The aquifer was then allowed to recover overnight before any further activities were conducted at the pumping well. On 23 May 2018, depth to water measurements of the pumping well and three primary monitoring wells were recorded as follows:

Well ID	Depth to Water (feet btoc)	Date/Time
R-03	232.43	5/23/2018 07:13
I-02	232.63	5/23/2018 07:32
O-02	231.54	5/23/2018 07:36
O-03	231.04	5/23/2018 07:28

The drawdown values observed during the R-03 pumping test and the spinner flow meter profiling results are plotted on Figures 4 and 5, respectively.

2.1.3 R-05 Pumping Test

Haley & Aldrich personnel conducted the pumping test at recovery well R-05 beginning on 20 May 2018. During this test, the pumping well (R-05) and nearby wells O-04 and I-03 (primary monitoring wells) were monitored with dedicated transducers at a rate of one measurement per minute.

The submersible pump used to conduct the test was installed on 19 May 2018 with the pump intake at approximately 305 feet btoc. Prior to the start of pumping, depth to water measurements were taken in the pumping well and two primary monitoring wells and were recorded as follows:

Well ID	Depth to Water (feet btoc)	Date/Time
R-05	230.16	5/20/2018 07:35
O-04	229.56	5/20/2018 07:30
I-03	230.53	5/20/2018 07:25

The pump at R-05 was started on 20 May 2018 at 07:40. The first pumping step was conducted at an average rate of 5 gpm for 32 minutes; step 2 was conducted at an average rate of 11 gpm for 32 minutes; step 3 was conducted at an average rate of 20 gpm for 33 minutes; and, step 4 extended into the constant-rate test and was conducted at an average rate of 42 gpm for 504 minutes. After 103 minutes of pumping at the constant rate, SW Exploration conducted a spinner-flowmeter survey of

R-05. After 601 minutes of total pumping (including step-rate and constant-rate pumping), the pump was turned off and water level recovery monitoring commenced. Pumping was discontinued at 17:41.

After pumping was discontinued, manual depth to water measurements were recorded for the pumping and primary monitoring wells periodically for approximately 90 minutes. The aquifer was then allowed to recover overnight before any further activities were conducted at the pumping well. On 21 May 2018, depth to water measurements at the pumping well and two primary monitoring wells were recorded as follows:

Well ID	Depth to Water (feet btoc)	Date/Time
R-05	230.60	5/21/2018 07:12
O-04	230.01	5/21/2018 08:30
I-03	231.18	5/21/2018 07:10

The drawdown values observed during the R-05 pumping test and the spinner flow meter profiling results are plotted on Figures 6 and 7, respectively.

2.1.4 R-07 Pumping Test

Haley & Aldrich personnel conducted the pumping test at recovery well R-07 beginning 17 May 2018. During this test, the pumping well (R-07) and nearby wells O-05, O-06, and I-04 (primary monitoring wells) were monitored with dedicated transducers at a rate of one measurement per minute.

The submersible pump used to conduct the test was installed on 16 May 2018 with the pump intake at approximately 493 feet btoc. Prior to the start of pumping, depth to water measurements were taken in the pumping well and three primary monitoring wells and were recorded as follows:

Well ID	Depth to Water (feet btoc)	Date/Time
R-07	230.45	5/17/18 08:14
O-05	230.24	5/17/18 06:45
O-06	230.85	5/17/18 06:30
I-04	230.45	5/17/18 06:35

The pump at R-07 was started on 17 May 2018 at 08:16. The first pumping step was conducted at an average rate of 5 gpm for 37 minutes; step 2 was conducted at an average rate of 10 gpm for 59 minutes; step 3 was conducted at an average rate of 20 gpm for 40 minutes; and, step 4 extended into the constant-rate test and was conducted at an average rate of 39 gpm for 488 minutes. After 624 total pumping minutes, the pumping was terminated, and the recovery commenced. Pumping was discontinued at 18:40.

After pumping was terminated, manual depth to water measurements were recorded for the pumping and primary monitoring wells periodically for approximately 90 minutes. The aquifer was then allowed to recover overnight before any further activities were conducted at the pumping well. On 18 May

2018, depth to water measurements of the pumping well and three primary monitoring wells were recorded as follows:

Well ID	Depth to Water (feet btoc)	Date/Time
R-07	230.82	5/18/18 07:07
O-05	230.10	5/18/18 07:40
O-06	230.69	5/18/18 07:25
I-04	230.27	5/18/18 07:35

During the pumping test, the cable supporting the spinner-flowmeter tool became wrapped around the pump and consequently the tool could not be lowered to conduct the survey. On 18 May 2018, the tool was freed from the pump after pumping had terminated. The pump was re-installed to a depth of approximately 333 feet btoc and started pumping at 09:11, at a rate of approximately 40 gpm. After approximately 89 minutes of pumping, SW Exploration conducted a spinner-flowmeter survey. This test was in addition to the planned step- and constant-rate tests to collect the spinner-flowmeter data.

The drawdown values observed during the R-07 pumping test and the spinner flow meter profiling results are plotted on Figures 8 and 9, respectively.

2.2 FORMATION TESTING, UPPER BASIN FILL AND LOWER BASIN FILL UNITS

2.2.1 M55-UBF Pumping Test

On 14 May 2018, Haley & Aldrich personnel conducted a 3-hour, constant-rate pumping test of supplemental monitoring well M55-UBF. The pumping well (M55-UBF) and nearby wells M56-LBF, O-06, and O-07 were monitored using pressure transducers over the duration of the pumping and recovery test period. The transducers recorded data at a rate of one measurement per minute.

The submersible pump used to conduct the test was installed on 14 May 2018 and the intake was set at approximately 253 feet btoc. Prior to the start of pumping, depth to water measurements were taken in the pumping well and three monitoring wells and were recorded as follows:

Well ID	Depth to Water (feet btoc)	Date/Time
M55-UBF	229.38	5/14/18 12:50
M56-LBF	230.66	5/14/18 13:00
O-06	232.04	5/14/18 13:04
O-07	232.09	5/14/18 13:08

The pump at M55-UBF was started on 14 May 2018 at 13:28. The initial rate of discharge was 33 gpm. By 13:35, the discharge rate was adjusted to approximately 20 gpm using a ball valve at the well head; this rate of 20 gpm was then held constant throughout the duration of the test. Discharge was measured using an analog totalizer and calculated by timing the discharge over a period of 1 minute. In addition to the transducer measurements, manual depth to water and drawdown measurements were recorded every 15 minutes on a constant-rate aquifer test data field form for M55-UBF.

The pumping test was terminated after 180 minutes of pumping. The aquifer was then allowed to recover overnight. On 15 May 2018, depth to water measurements of the pumping well and three monitoring wells were recorded as follows:

Well ID	Depth to Water (feet btoc)	Date/Time
M55-UBF	229.57	5/15/18 06:40
M56-LBF	230.70	5/15/18 07:30
O-06	231.67	5/15/18 12:39
O-07	231.72	5/15/18 12:43

The drawdown values observed during the M55-UBF pumping test are plotted on Figure 10.

2.2.2 M56-LBF Pumping Test

On 31 May 2018, Haley & Aldrich personnel conducted a 3-hour, constant-rate pumping test of supplemental monitoring well M56-LBF. The pumping well (M56-LBF) and nearby wells M55-UBF, O-06, and O-07 were monitored using pressure transducers over the duration of the pumping test and recovery period. The transducers recorded data at a rate of one measurement per minute.

The submersible pump used to conduct the test was installed on 31 May 2018 with the intake set at approximately 312 feet btoc. Prior to the start of pumping, depth to water measurements were taken in the pumping and four monitored wells and were recorded as follows:

Well ID	Depth to Water (feet btoc)	Date/Time
M56-LBF	229.21	5/31/18 11:38
M55-UBF	226.54	5/31/18 11:15
O-06	229.55	5/31/18 11:32
O-07	229.63	5/31/18 11:21

The pump at M56-LBF was started on 31 May 2018 at 11:56. The discharge rate was set to approximately 15 gpm using a ball valve at the well head and held constant at this rate throughout the duration of the pumping test. Discharge and totalizer measurements were recorded using a digital meter with instantaneous flow rate display. In addition to the transducer measurements, manual depth to water and drawdown measurements were recorded every 15 minutes on a constant-rate aquifer test data field form for M56-LBF.

Pumping was discontinued after 186 minutes and the aquifer was then allowed to recover overnight before any further activities were conducted at the pumping well. On 01 June 2018, the depth to water measurement for M56-LBF was recorded as 229.07 feet btoc.

The drawdown values observed during the M56-LBF pumping test are plotted on Figure 11.

2.3 TRACER TESTING

In accordance with Part II.C.8 of the UIC Permit, Florence Copper conducted a tracer test to characterize the formation flow characteristics within the PTF well field. During the tracer test, fluorescent dye was injected in each of the four injection wells (I-01, I-02, I-03, and I-04) while pumping was ongoing at the center recovery well (R-09) at the center of the PTF well field in an attempt to draw the tracer through the formation. The outer recovery wells (R-01 through R-08) were incorporated and used as water level observation points, and the advancement of the tracer from the injection wells was monitored based on observed arrival and concentration observed at the Westbay® wells. There are four Westbay multi-sampling level wells with five sampling zones in each well. The Westbay wells are located between the center recovery well and the injection wells as shown on Figure 1.

Prior to injection of the tracer compound, the center recovery well was started to establish the flow field between the injection wells and recovery well. Groundwater was pumped from the center recovery well (R-09) and distributed by a manifold to the four injection wells (I-01, I-02, I-03, and I-04). The pump intake in R-09 was set at approximately 500 feet below ground surface (bgs). The four injection wells were equipped with straddle packer assemblies to constrain injection into an interval near the center of the screened interval. The bottom packers were landed at approximately 890 feet bgs and the top packers were landed at approximately 656 feet bgs in the blank stainless sections of the well casing.

Native groundwater was circulated for approximately 22 hours prior to introducing the tracer compound. During this time, flow rate from the center recovery well and injection rates into the injection wells were adjusted and monitored to ensure the operating rates would be sustainable for the duration of the test.

On 20 June 2018 at 12:31, dilute fluorescent dye was introduced to the system by pumping dye solution into the discharge line from the pumping well R-09, prior to the distribution manifold leading to the four injection wells. The dilute dye solution was generated by mixing 4 pounds of powdered dye with 55 gallons of fresh water in a mixing tank. The 55-gallons of dye solution was injected over a period of 22.5 hours using a peristaltic pump. At the time of injection, the flow rate of R-09 was approximately 80 gpm. The concentration of fluorescent dye injected was measured at approximately 320 parts per billion (ppb) after a 9:1 dilution with fresh water (approximately 2,880 ppb actual) with a portable fluorescence meter calibrated for fluorescent dye.

Once all of the tracer compound had been injected, Haley & Aldrich personnel began sampling of the four adjacent Westbay wells: WB-01, WB-02, WB-03, and WB-04. Each Westbay well consists of five individual sampling zones that are sealed off by inflatable packers. Zone 1 is approximately 1,127 feet bgs, Zone 2 is approximately 987 feet bgs, Zone 3 is approximately 847 feet bgs, Zone 4 is approximately 706 feet bgs, and Zone 5 is approximately 566 feet bgs. Groundwater samples of each zone were taken daily in the same order. Groundwater samples collected from each zone were then measured for fluorescent dye concentration using a portable calibrated fluorescent meter. It should be noted that not all zones functioned properly during the entirety of the test; therefore, not all zones were able to be sampled every day. Background samples were also collected from functioning zones in each Westbay well and tested for fluorescence before any dye injection occurred. After collection of each groundwater sample, the Westbay sampling equipment was decontaminated using a bleach solution and de-ionized water.

On 25 June 2018 at 14:22, the generator powering the pump at R-09 cut out and the pump was shut off. Pumping did not re-start until 17:37. The pump was off for a total of 3 hours and 15 minutes. The temporary shutoff of the recirculation is expected to have no significant impacts on the tracer transport behavior. The tracer test was terminated when it was confirmed that fluorescent dye was detected in at least one sample zone in each Westbay well. On 28 June 2018 at 15:32, the tracer re-circulation test was ended, and the pump was shut off.

Key findings developed from the tracer test results are discussed below in Section 3.3.

3. Test Results

The aquifer pumping results were analyzed using the program, AQTESOLV (http://www.aqtesolv.com/ and Duffield, 2007). The pumping rate and observed drawdown data were analyzed using the Hantush-Jacob, Moench, and Theis solutions to characterize the hydraulic properties of the tested aquifer zones. The drawdown at observation wells during extraction at the recovery wells was also evaluated to determine the influence of the pumping well.

3.1 RESULTS OF PUMPING TESTS AT FOUR OUTERMOST RECOVERY WELLS

Table 1 summarizes the testing conditions, key observations, and qualitative data interpretation. The water elevation and drawdown trends for the outermost recovery wells, including R-01, R-03, R-05, and R-07, are plotted in Figures 2 through 5. The spinner flow profiling results are plotted on Figures 6 through 9. The raw data for the spinner flow survey are provided in Appendix B. The AQTESOLV results are summarized in Table 2; the full results, including curve fitting solutions, are provided in Appendix C.

The key conclusions of the pumping tests conducted at four outermost recovery wells are:

- The pumping rates at the pumping wells were similar (approximately 40 gpm); however, the maximum drawdowns observed at the pumping wells ranged from 9.5 feet to 30.4 feet, showing some local variability of hydraulic properties in the tested aquifer.
- The spatial drawdown patterns of each of the pumping tests indicate that horizontal anisotropy is not significant in the tested aquifer, evidenced by similar drawdowns observed at the monitoring wells located at similar distances, but in different directions, from the pumping wells.
- A pumping rate of 40 gpm at R-05 and R-07 can induce a significant drawdown (>4 feet) at MW-01-O, indicating a net excess pumping rate of 40 gpm during solution mining in the bedrock formation at the PTF can effectively control the movement of injected solution. Based on the observed magnitude of drawdown at the downgradient operational monitoring well, it is likely the injected solution could be controlled at a lower net extraction rate.
- The observed aquifer responses can be simulated using the analytical solution based on Darcy's law, indicating that the equivalent porous medium assumption is appropriate for the tested aquifer.
- The results of the quantitative analysis using AQTESOLV are consistent with aquifer parameters used in the groundwater flow model prepared in support of APP and UIC permit applications. The estimated average hydraulic conductivity for the tested aquifer is 0.54 feet per day (ft/d), which is consistent with the hydraulic conductivity value (0.57 ft/d) used for the more permeable oxide layers in the site-specific numerical groundwater flow model.[1] The estimated specific storage is 5.2E-7 $feet^{-1}$, which is about an order of magnitude less than the value (5E-6 $feet^{-1}$)used in the model. The specific storage parameter only affects how fast the flow system approaches the steady-state flow conditions and does not have a significant impact on the size of the capture zone achievable by a pumping well at steady-state conditions.

[1] Application for temporary individual Aquifer Protection Permit, Attachment 14A – Hydrologic study Part B, Groundwater flow model (Item 19.H) submitted by Curis Resources (Arizona) Inc.

- The spinner flow profiling results qualitatively show the variability of horizontal hydraulic conductivity at various depths, and that:
  - The lower screened interval is much less permeable than the middle and upper screened intervals; and
  - Low water yield intervals are present between 700 feet bgs and 1000 feet bgs.

3.2 RESULTS OF PUMPING TESTS AT M55-UBF AND M56-LBF

Table 1 summarizes the testing conditions, key observations, and qualitative data interpretation of wells M-55-UBF and M56-LBF. Due to limitation of available drawdown (approximately 20 feet) at pumping well M55-UBF, the test could not produce observable drawdown at the observation wells. The water elevation and drawdown trends for these two pumping tests are plotted in Figures 10 and 11. The AQTESOLV results are provided in Table 2; the full results, including curve fitting, are provided in Appendix C. The AQTESOLV results indicate that the horizontal hydraulic conductivity values of UBF and LBF units (12 ft/d and 2.1 ft/d, respectively) are lower than or near the lower-end values used in the model (20 ft/d and 1 ft/d, respectively).

For the M56-LBF test, a total drawdown of 39.1 feet was achieved at the pumping well. Based on the AQTESOLV analysis using the assumption that the LBF and upper oxide zone are an integrated aquifer, a vertical anisotropic ratio less than 0.1 may exist, suggesting that the vertical hydraulic conductivity between the LBF and upper oxide units is less than 0.5 ft/d. The results indicate that the vertical hydraulic conductivity values used in the model may overestimate the hydraulic connection between the LBF and oxide units.

3.3 TRACER TEST RESULTS

The tracer breakthrough results are shown in Figures 12 through 16. The water elevation trends for each of the wells with a transducer installed during the tracer test are plotted on Figure 17. The tracer was injected only through the middle-screened interval (approximately 675 to 890 feet bgs) in each injection well. The tracer observations at the Westbay wells are summarized below:

- WB-01: The first tracer arrival was detected on 25 June 2018, at a concentration of 0.3 and 200 ppb. First breakthrough was detected in zones 1 and 2, and had been detected in each zone 26 June 2018, approximately 6 days after injection began (Figure 12).
- WB-02: The first tracer arrival was detected on 24 June 2018, at a concentration of 0.8 ppb. First breakthrough was detected in zone 1 and had been detected in each zone, except zones 1 and 5 by 28 June 2018, approximately 8 days after injection began (Figure 13). Zone 5, the deepest zone, did not detect a tracer concentration during the test period.
- WB-03: The first tracer arrival was detected on 23 June 2018, at a concentration of 30 ppb. First breakthrough was detected in zone 5 and had been detected in zones 1, 3, and 5 by 27 June 2018, approximately 7 days after injection began (Figure 14).
- WB-04: The first tracer arrival was detected on 22 June 2018, at a concentration of 50 and 15 ppb. First breakthrough was detected in zones 3 and 4, and had been detected in each zone by 28 June 2018, approximately 8 days after injection began (Figure 15).

The breakthrough behavior at recovery well R-09 shows a gradual increase in tracer concentration. The first breakthrough at R-09 occurred on 23 June 2018, at a concentration of 10 ppb. Toward the end of

monitoring, the tracer concentration trend appeared to level off at a concentration of 30 ppb, indicating that the concentration was close to peak 7 days after initial tracer injection. Based on the 70-foot distance between the injection wells and well R-09, the average tracer velocity between the injection wells to the recovery well is approximately 10 feet per day under test pumping conditions.

In summary, the tracer test results have verified the following:

- The recirculation between injection and recovery wells can control the flow direction of the injected fluid.
- The tracer breakthrough occurred within the anticipated time frame (within 14 days) described in the Plan, which was developed based on the transport parameters used in the groundwater flow model. Consequently, the tracer test confirms that the formation properties used in the groundwater flow model are representative of actual conditions observed in the PTF well field area.

4. Conclusion

Florence Copper has completed pre-operational formation testing at the PTF at the FCP Site. The pre-operational testing is prescribed in UIC Permit R9UIC-AZ3-FY11-1 and was conducted in consultation with ADEQ in order to satisfy additional requirements set forth in APP No. P-106360. The pre-operational testing included pump tests completed at the four outermost recovery wells in the PTF well field, pump testing on one well completed in the upper basin fill unit, pump testing of one well completed in the lower basin fill unit, and a tracer test completed in the PTF well field.

The testing was conducted for the purpose of examining assumptions used during the permitting process regarding hydraulic behavior of the formation as it relates to the ability to maintain hydraulic control and to meet Best Available Design Control Technology (BADCT) requirements.

Results of the testing described in this document demonstrate that;

1. The hydraulic properties used in the groundwater flow model are representative of actual hydraulic properties observed in the PTF well field.
2. No strong horizontal anisotropy exists within the oxide formation in the PTF well field.
3. The equivalent porous media assumption used in development of the groundwater flow model is appropriate.
4. There is sufficient hydraulic connection between the PTF recovery wells, observation wells, supplemental monitoring wells, and point of compliance wells to demonstrate that a cone of depression has been created by the planned pumping.
5. The cone of depression created by planned PTF pumping is sufficient to establish and maintain hydraulic control.

These findings indicate that the PTF well field can establish and maintain hydraulic control of injected fluids and can achieve BADCT requirements set forth in APP No. P-106360.

5. References

1. Duffield, G.M., 2007. AQTESOLV for Windows Version 4.50.002 Professional: HydroSOLVE, Inc., http://www.aqtesolv.com/

2. Florence Copper Inc., 2018. *Notification of Intent and Scope of Planned Formation Testing for the PTF Area Florence Copper Project, Florence Arizona.* 22 March.

G:\Projects\Florence Copper\129687 PTF Well Drilling\Deliverables\Formation Testing Report\2018-0801_AquiferTestingRept_F.docx

TABLES

TABLE 1
SUMMARY OF PUMPING TEST CONDITIONS AND OBSERVATIONS
FLORENCE COPPER INC.
FLORENCE, ARIZONA

Pumping Well ID	Date/Time Start	Date/Time Stop	Approximate Pumping Rate (gpm) Step 1	Step 2	Step 3	Step 4	Observations
R-01	5/24/2018 7:45	5/24/2018 17:20	6	11	19	40	Total drawdown at the pumping well: 14.3 feet. The decrease in the water head level related to each pumping step can be easily observed in the drawdown plot (Figure 2). Three nearby wells were monitored for drawdown during the R-01 pumping test (distance to the pumping well provided): O-07 (71 ft), I-01 (71 ft), and O-01 (71 ft). The average drawdown of these wells was approximately 6.4 feet, with well O-01 observing the largest total drawdown of 6.7 feet. The drawdown trends for the observed wells displayed consistent drawdown levels throughout the extent of the test. The fact that the three observation wells located on the east, south, and west. The results support that no strong horizontal aquifer anisotropy near R-01.
R-03	5/22/2018 7:54	5/22/2018 17:29	6	8	22	41	Total drawdown at the pumping well: 29.9 feet. The decrease in the water head level related to each pumping step can be easily observed in the drawdown plot (Figure 3). Three nearby wells were monitored for drawdown during the R-03 pumping test (distance to the pumping well provided): O-02 (71 ft), I-02 (72 ft), O-03 (80 ft). The average drawdown of wells O-02 and I-02 was approximately 8.0 feet, with well O-03 observing the largest total drawdown of 8.6 feet. The drawdown trends displayed consistent drawdown levels throughout the extent of the test. The results indicate that there is no strong horizontal aquifer anisotropy near R-03.
R-05	5/20/2018 7:40	5/20/2018 17:41	5	11	20	42	Total drawdown at the pumping well: 30.4 feet. The decrease in the water head level related to each pumping step can be easily observed in the drawdown plot (Figure 4). Four nearby wells were monitored for drawdown during the R-05 pumping test (distance to the pumping well provided): O-04 (70 ft), I-03 (71 ft), M60-O (129 ft), and MW-01-O (427 ft). The drawdown trends for the observed wells displayed consistent drawdown levels throughout the extent of the test. The average drawdown of wells O-04 and I-03 was approximately 7 feet, which is similar to the RO-01 and RO-03 pumping tests. The results support that no strong horizontal aquifer anisotropy exists near R-05. The maximum drawdown observed at M-01-O was 4.7 feet, indicating that a 40 gpm pumping rate at the recovery well can significantly influence groundwater hydraulics in the oxide zone 400 feet away from the pumping well. The results indicate that a net excess pumping rate of 40 gpm during solution mining in the formation at the Proposed Test Facility can effectively control the movement of injected solution.
R-07	5/17/2018 8:16	5/17/2018 18:40	5	10	20	39	Total drawdown at the pumping well: 9.5 feet. The decrease in the water head level related to each pumping step can be easily observed in the drawdown plot (Figure 5). Six nearby wells were monitored for drawdown during the R-07 pumping test (distance to the pumping well provided): O-06 (71 ft), I-04 (71 ft), O-05 (91 ft), M57-O (209 ft), MW-01-O (244 ft), and M60-O (233 ft). The average drawdown of wells O-06 and I-04 was approximately 5.9 feet,
M55-UBF	5/14/2018 13:28	5/14/2018 16:28	20				Total drawdown at the pumping well: 9.4 feet. A consistent pumping rate of approximately 20 gpm was maintained for the duration of the pump test. Nearly immediately after the start of pumping, a decrease in the water head level was observed, but maintained a fairly consistent drawdown depth of approximately 9 feet. Three nearby wells were monitored for drawdown during the M55-UBF pumping test (distance to the pumping well provided): M56-LBF (32 ft), O-06 (80 ft), and O-07 (82 ft). A decrease in water level was not observed in nearby wells during the pumping period, indicating that the hydraulic connection between the UBF and LBF units is limited.
M56-LBF	5/31/2018 11:56	5/31/2018 15:02	15				Total drawdown at the pumping well: 39.1 feet. A consistent pumping rate of approximately 15 gpm was maintained for the duration of the pump test. Nearly immediately after the start of pumping, the decrease in the water level was substantial, but maintained a fairly consistent drawdown depth of approximately 39 feet. Three nearby wells were monitored for drawdown during the M56-LBF pumping test (distance to the pumping well provided): M55-UBF (32 ft), O-06 (107 ft), and O-07 (109 ft). A decrease in water head level was not observed in nearby wells during the pumping period, indicating that the hydraulic connection between the LBF and the oxide units is restricted.

Notes:
gpm = gallons per minute
ft = feet

TABLE 2
AQUIFER HYDRAULIC DATA OBTAINED FROM AQTESOLV ANALYSIS
FLORENCE COPPER INC
FLORENCE, ARIZONA

R-01 - Pumping Well						
Observation Wells	Estimated Aquifer Parameters					
	T (ft^2/d)	S	1/B (ft)	Sw	C	P
O-01	407	9.8E-04	7.5E-04	-3.6	0.13	1.75
O-07	411	1.4E-03	9.1E-04	-3.5	0.13	1.75
I-01	407	1.0E-03	8.6E-04	-3.6	0.13	1.75

R-03 - Pumping Well						
Observation Wells	Estimated Aquifer Parameters					
	T (ft^2/d)	S	1/B (ft)	Sw	C	P
O-02	434	7.8E-04	2.4E-05	-0.2	0.34	1.63
O-03	364	3.4E-04	7.3E-04	-1.5	0.34	1.63
I-02	331	7.8E-04	1.6E-03	-1.5	0.34	1.63

R-05 - Pumping Well						
Observation Wells	Estimated Aquifer Parameters					
	T (ft^2/d)	S	1/B (ft)	Sw	C	P
0-04	522	7.8E-04	2.7E-04	2.3	0.13	1.50
I-03	447	6.0E-04	5.9E-04	0.9	0.13	1.50
M60-O	615	7.9E-04	1.7E-04	3.8	0.13	1.50
MW-01-O	426	1.0E-04	4.0E-04	-0.1	0.13	1.50

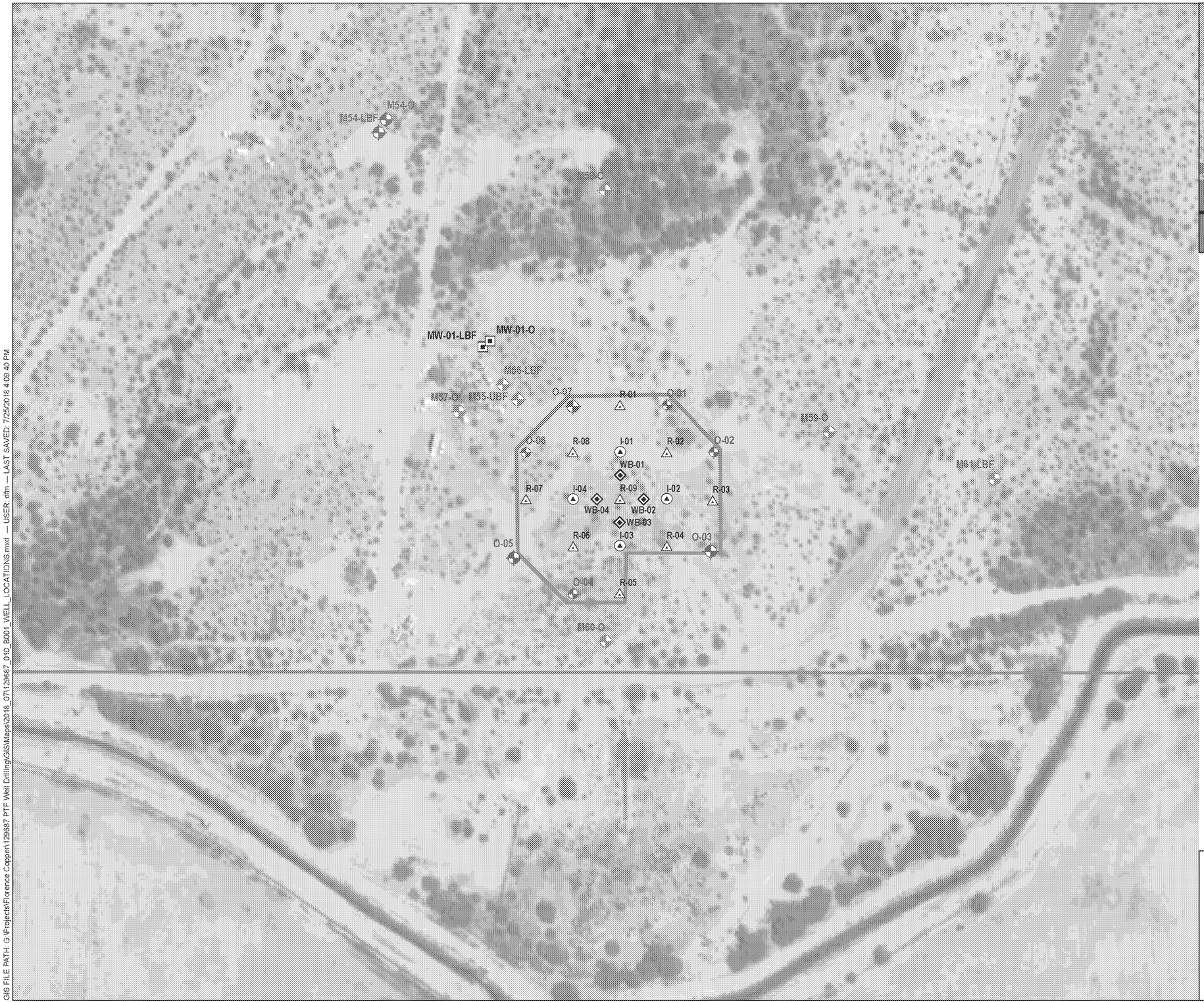
R-07 - Pumping Well						
Observation Wells	Estimated Aquifer Parameters					
	T (ft^2/d)	S	1/B (ft)	Sw	C	P
O-05	407	1.3E-04	4.4E-04	-5.2	0.087	1.64
0-06	544	5.0E-04	2.4E-05	-4.3	0.087	1.64
I-04	522	7.5E-04	1.9E-04	-4.2	0.087	1.64
M60-O	544	4.2E-04	7.2E-04	-4.3	0.087	1.64
M57-O	482	1.1E-04	3.8E-04	-5.1	0.087	1.64
MW-01-O	453	6.5E-05	2.4E-05	-5.6	0.087	1.64

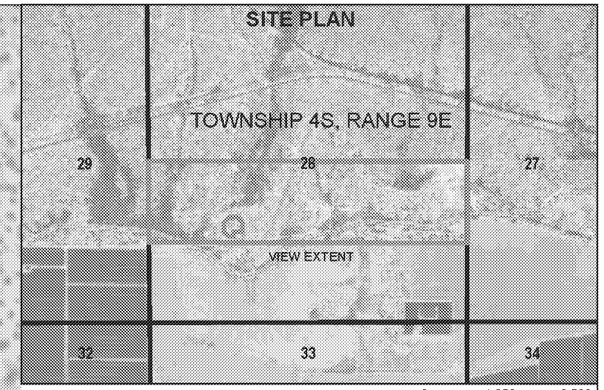
UBF and LBF Pumping Wells					
Pumping Wells	Key Estimated Aquifer Parameters				
	T (ft^2/d)	K (ft/d)	S	Ss (ft^{-1})	Sy
M55-UBF	483	12	1.2E-03	2.3E-05	0.1
M56-LBF	107	2.1	3.2E-03	6.4E-05	

Notes:

1. *T = transmissivity, S = storage coefficient, 1/B = leaky factor, Sw = skin factor, C = nonlinear well loss coefficient; P = nonlinear well loss exponent; K = hydraulic conductivity; Ss = specific storage ; ft= feet; ft/d = feet per day; ft^2/day = square feet per day.*
2. *Aquifer thickness was (H) assumed to be 841 feet.*
3. *Geometric means of T and S using the results of R-01, R-03, R-05, and R-07 are 451.5 ft^2/d and 4.34E-4.*
4. *The average hydraulic conductivity (calculated using the ratio of the geometric mean of T to H) was estimated to be 0.54 ft/d.*
5. *The estimated specific storage (calculated using the ratio of the geometric mean of S to H) was 5.2E-7 ft^{-1}.*

FIGURES





LEGEND

- OBSERVATION WELL
- SUPPLEMENTAL MONITORING WELL
- POINT-OF-COMPLIANCE WELL

PTF WELLS

- INJECTION
- RECOVERY
- WESTBAY WELL
- OPERATIONAL MONITORING
- PTF WELL FIELD
- STATE LAND LEASE

NOTES

1. ALL LOCATIONS AND DIMENSIONS ARE APPROXIMATE.
2. AERIAL IMAGERY SOURCE: ESRI

0 150 300
SCALE IN FEET

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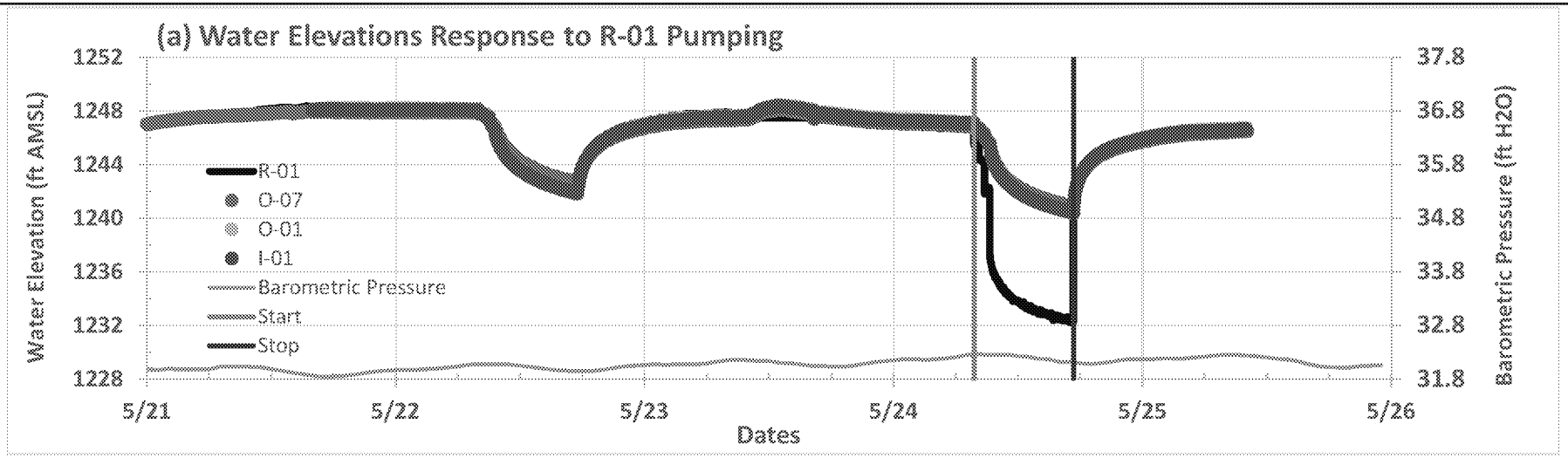
FLORENCE COPPER PROJECT
FLORENCE, ARIZONA

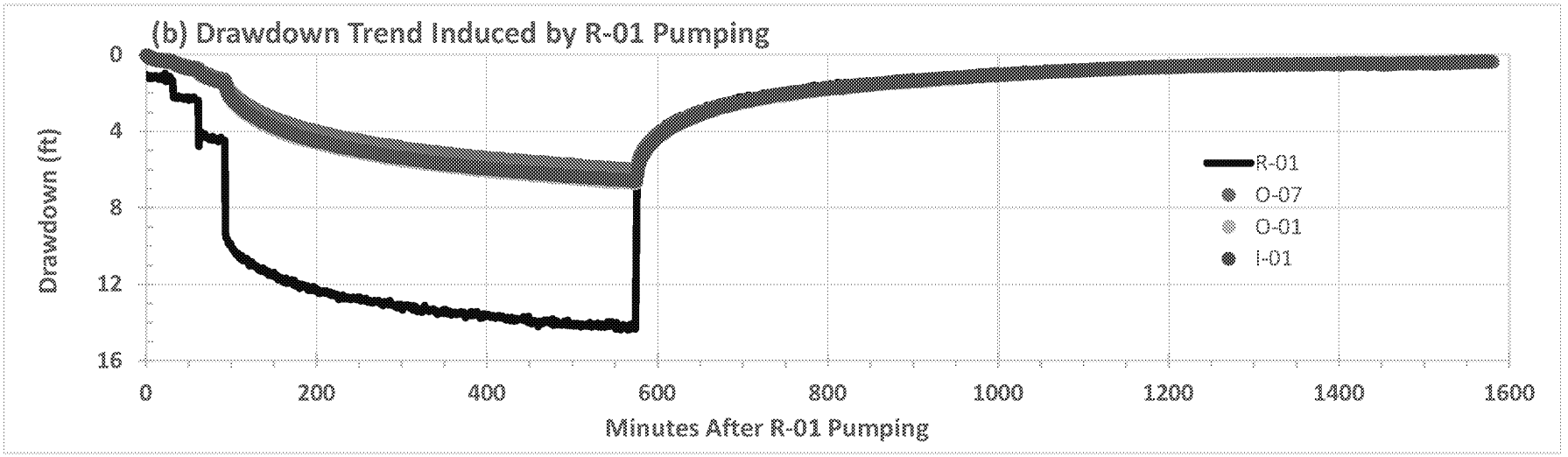
AQUIFER TESTING WELL LOCATIONS

FLORENCE COPPER INC. JULY 2018

FIGURE 1

GIS FILE PATH: G:\Projects\Florence Copper\129687 PTF Well Drilling\GIS\Maps\2018_07\129687_010_B001_WELL_LOCATIONS.mxd -- USER: dfm -- LAST SAVED: 7/25/2018 4:09:40 PM





NOTES

1. Transducer data are based on compensated values. Water elevation values are based on transducer data.
2. The magnitude of barometric pressure fluctuation is very small in comparison with the magnitude of drawdown; therefore, correction to the drawdown values is not needed.
3. The influence of R-03 pumping is shown between 5/22 and 5/23.
4. The influence of R-01 pumping is shown between 5/24 and 5/25.

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R-01 PUMPING TEST
HYDROGRAPHS AND DRAWDOWN TRENDS

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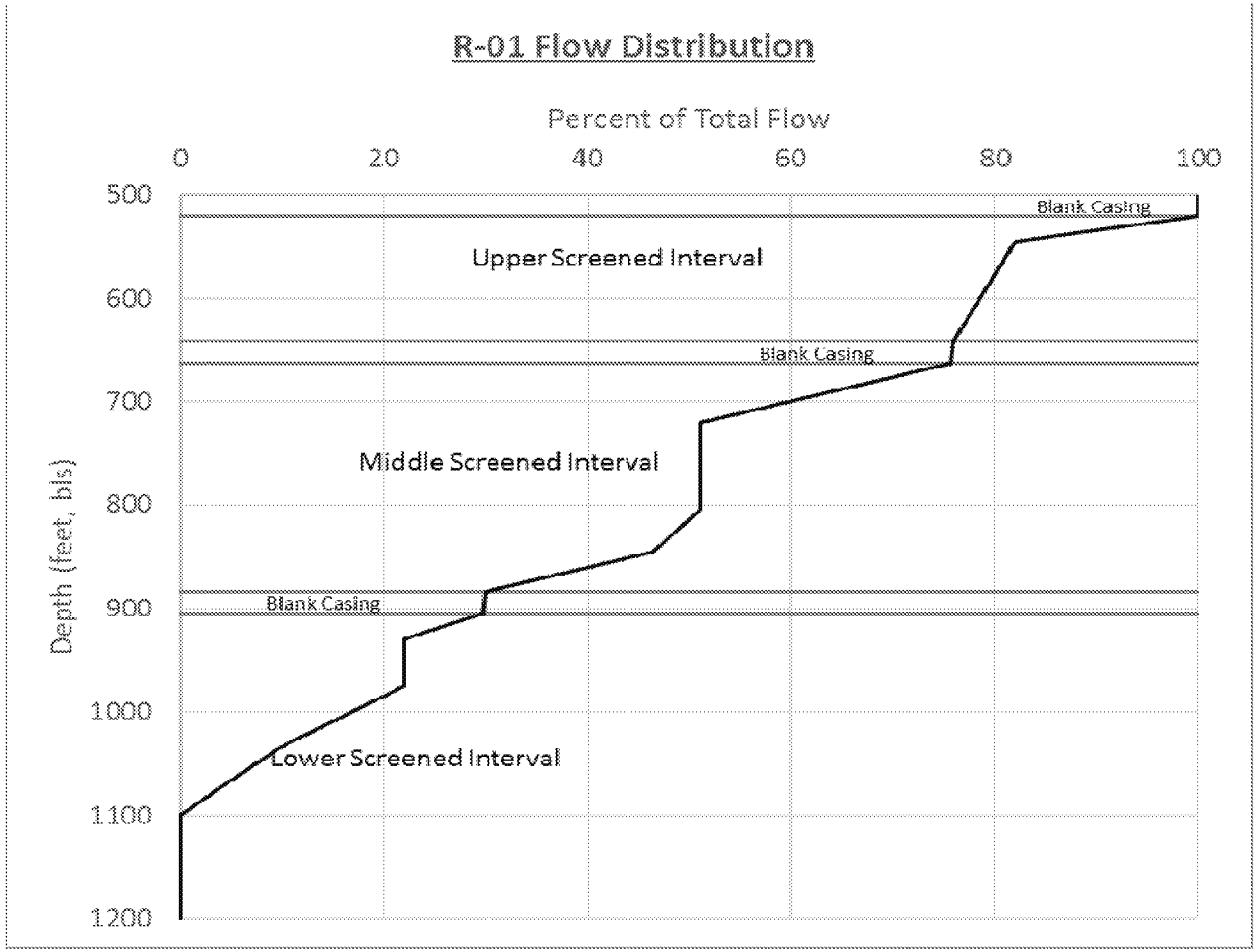
FIGURE 2

G:\Projects\Florence Copper\129687 PTF Well Drilling\Deliverables\Formation Testing Report\Figures\[Figure 02_R-01_Hyd



NOTES

bls = below land surface
Raw data are provided in Appendix B.

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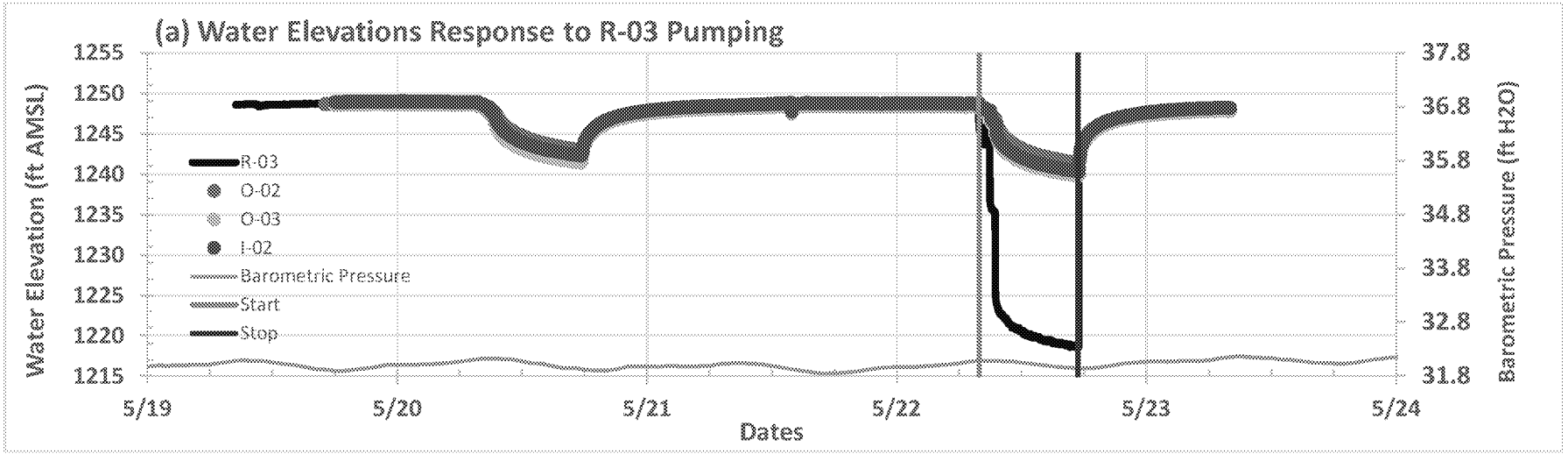
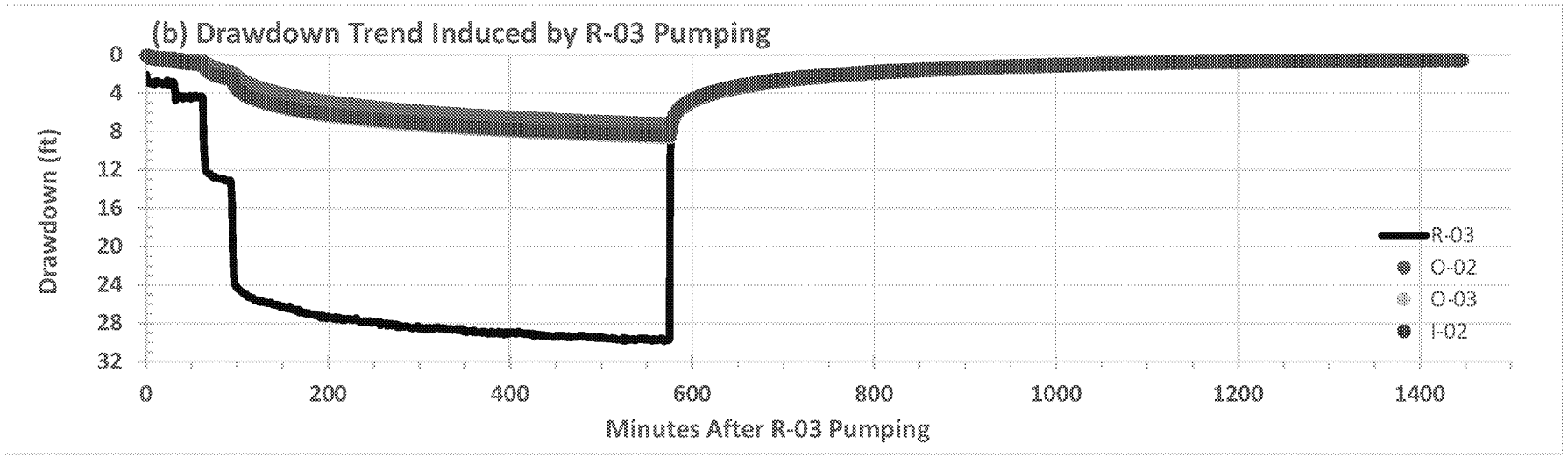
R-01 SPINNER FLOW PROFILING

JULY 2018

FIGURE 3

G:\Projects\Florence Copper\129687 PTF Well Drilling\Deliverables\Formation Testing Report\Figures\[Figure 03_R-01_Spi





NOTES

1. Transducer data are based on compensated values. Water elevation values are based on the transducer data.
2. The magnitude of barometric pressure fluctuation is very small in comparison with the magnitude of drawdown; therefore, correction to the drawdown values is not needed.
3. The influence of R-05 pumping is shown between 5/20 and 5/21.
4. The influence of R-03 pumping is shown between 5/22 and 5/23.

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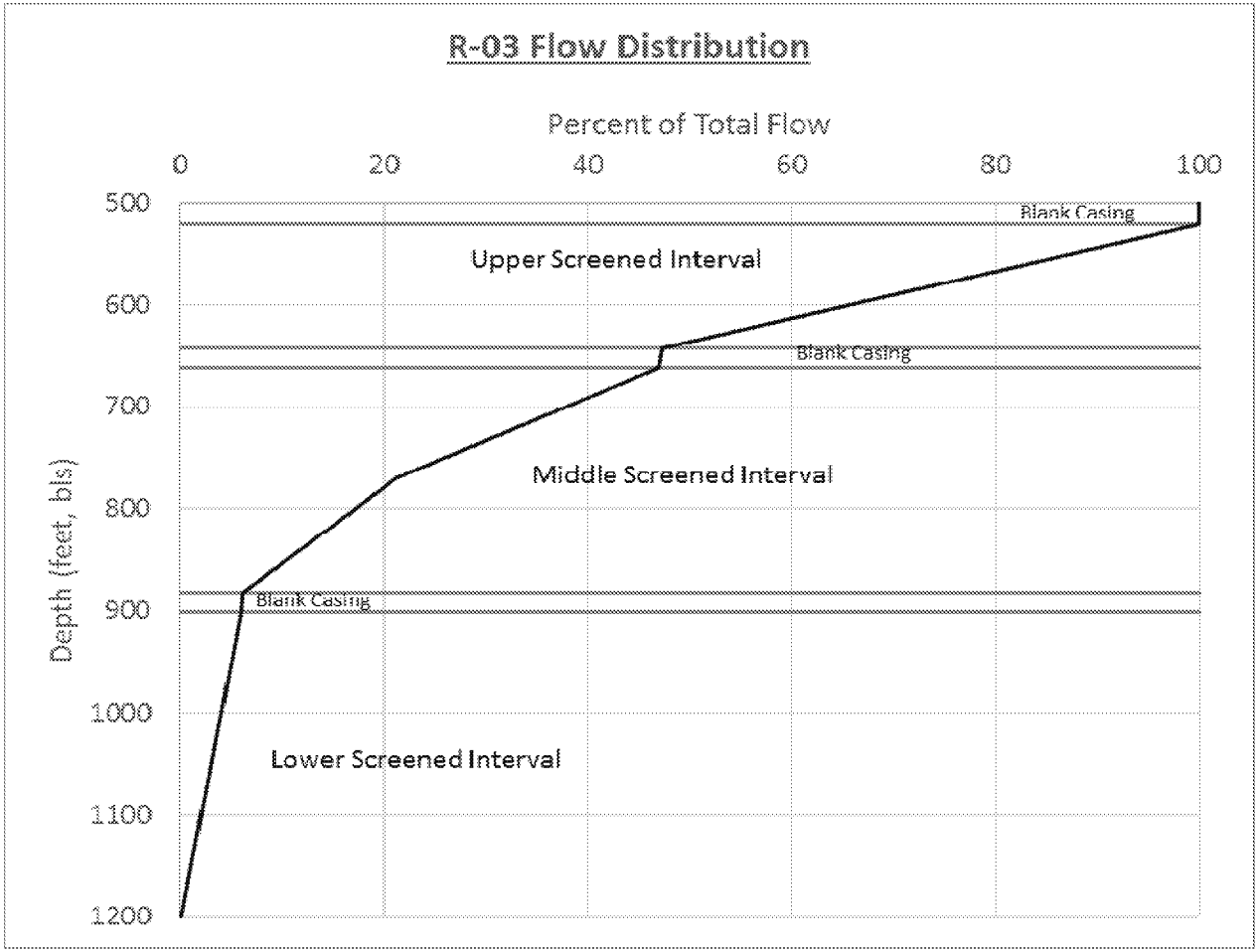
R-03 PUMPING TEST
HYDROGRAPHS AND DRAWDOWN TRENDS

JULY 2018

FIGURE 4

G:\Projects\Florence Copper\129687 PTF Well Drilling\Deliverables\Formation Testing Report\Figures\[Figure 04_R-03_Hyd



NOTES

bls = below land surface
Raw data are provided in Appendix A.

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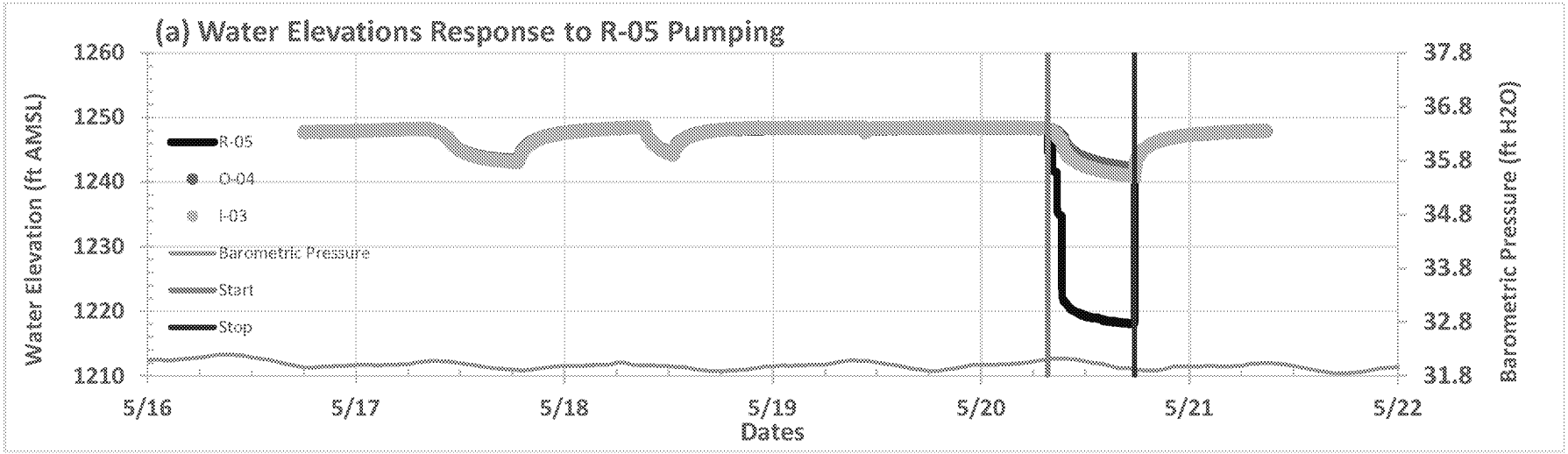
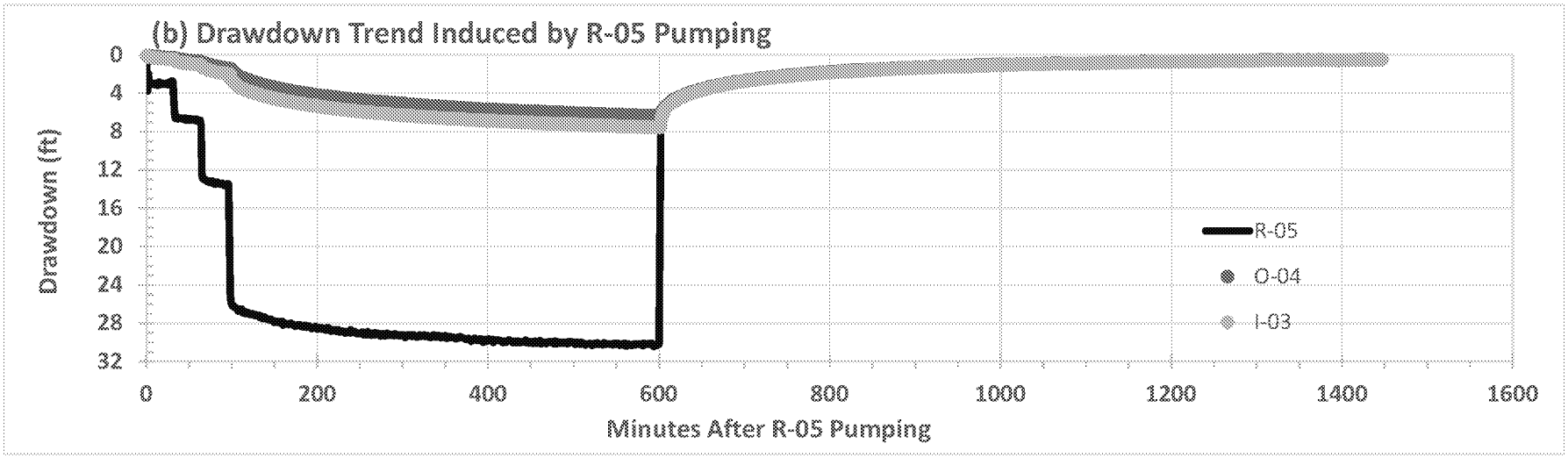
R-03 SPINNER FLOW PROFILING

JULY 2018

FIGURE 5

G:\Projects\Florence Copper\129687 PTF Well Drilling\Deliverables\Formation Testing Report\Figures\[Figure 05_R-03_Spi





NOTES

1. Transducer data are based on compensated values. Water level elevation values are based on transducer data.
2. The magnitude of barometric pressure fluctuation is very small in comparison with the magnitude of drawdown; therefore, correction to the drawdown values is not needed.
3. The influence of R-07 pumping is shown between 5/17 and 5/18.
4. The influence of R-07 spinner flow profiling is shown between 5/18 and 5/19.

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R-05 PUMPING TEST
HYDROGRAPHS AND DRAWDOWN TRENDS

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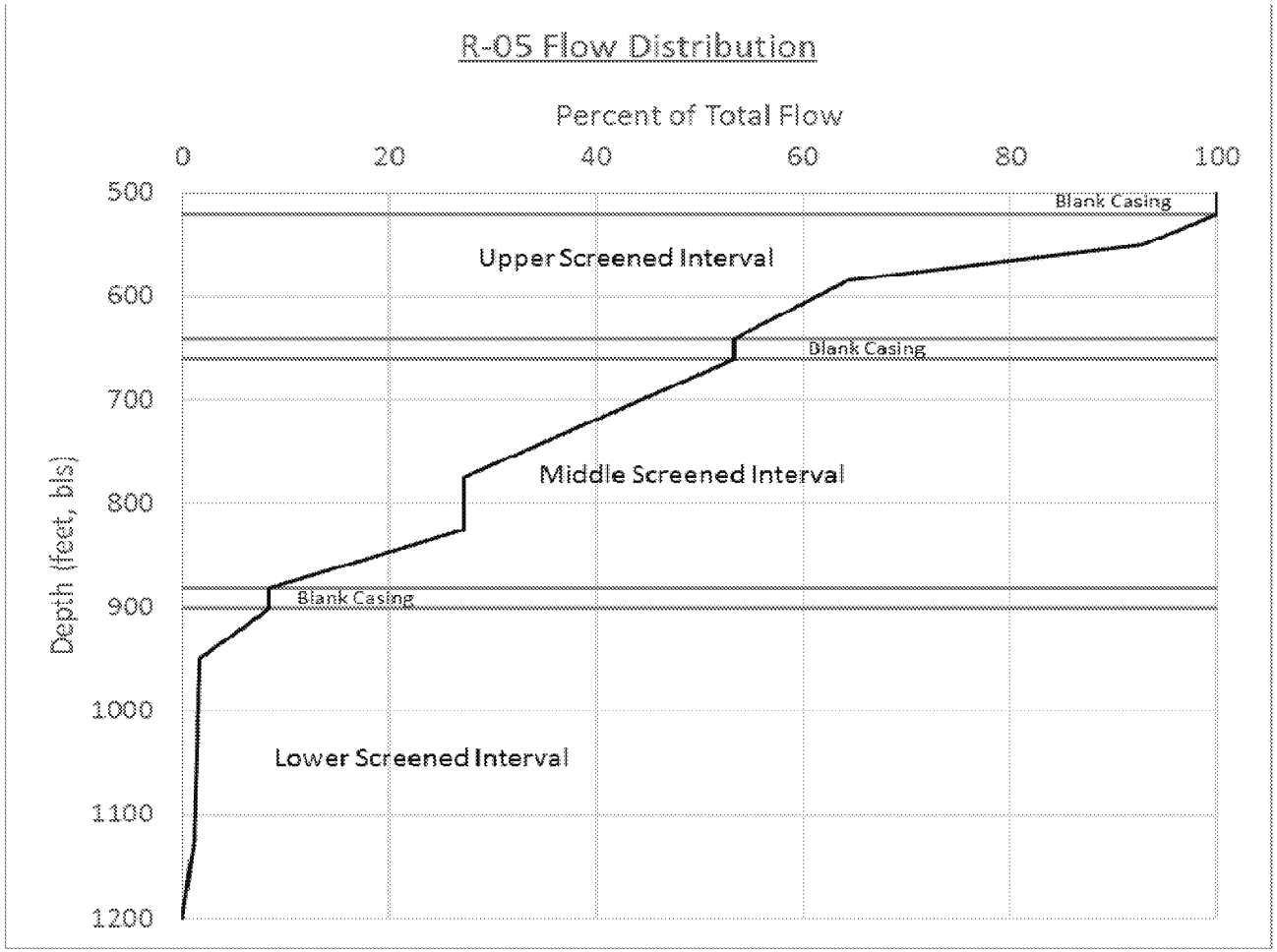
FIGURE 6

G:\Projects\Florence Copper\129687 PTF Well Drilling\Deliverables\Formation Testing Report\Figures\[Figure 06_R-05_Hyd



NOTES

bls = below land surface
Raw data are provided in Appendix A.

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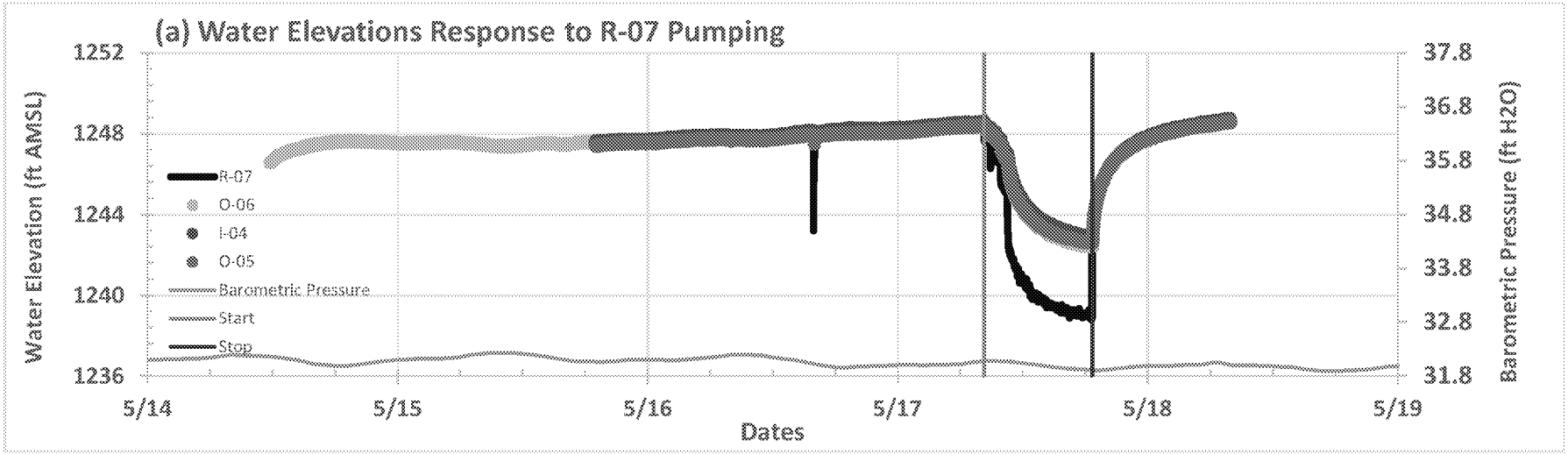
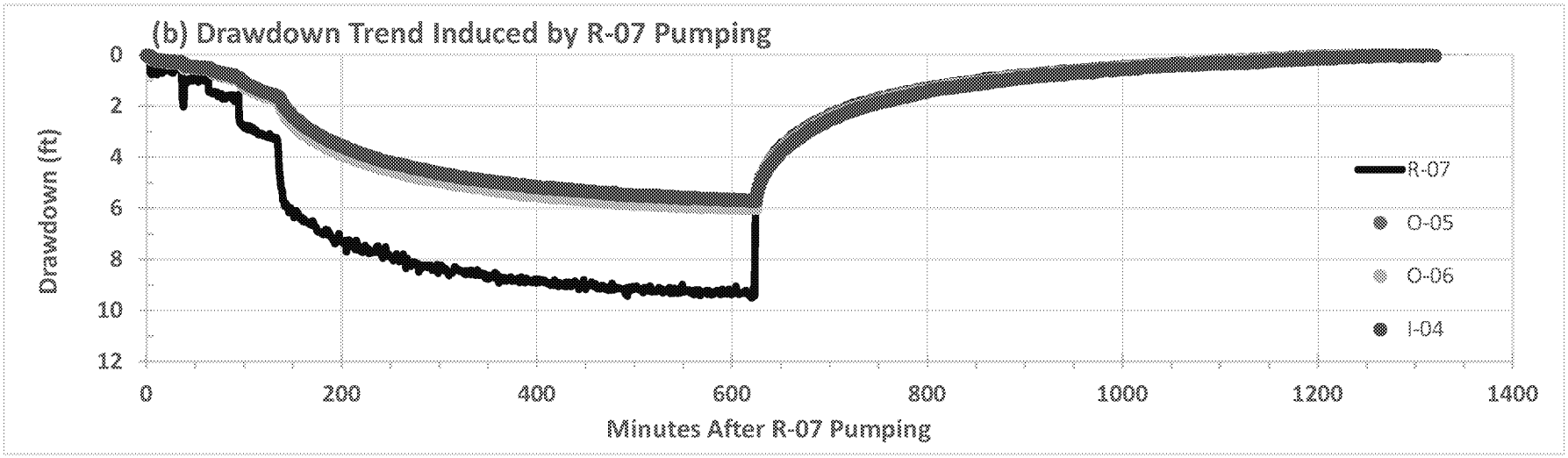
R-05 SPINNER FLOW PROFILING

JULY 2018

FIGURE 7

G:\Projects\Florence Copper\129687 PTF Well Drilling\Deliverables\Formation Testing Report\Figures\[Figure 07_R-05_Spi





NOTES

1. Transducer data are based on compensated values. Water elevation values are based on the transducer data.
2. The magnitude of barometric pressure fluctuation is very small in comparison with the magnitude of drawdown; therefore, correction to the drawdown values is not needed.
3. The influence of R-07 pumping is shown between 5/17 and 5/18.

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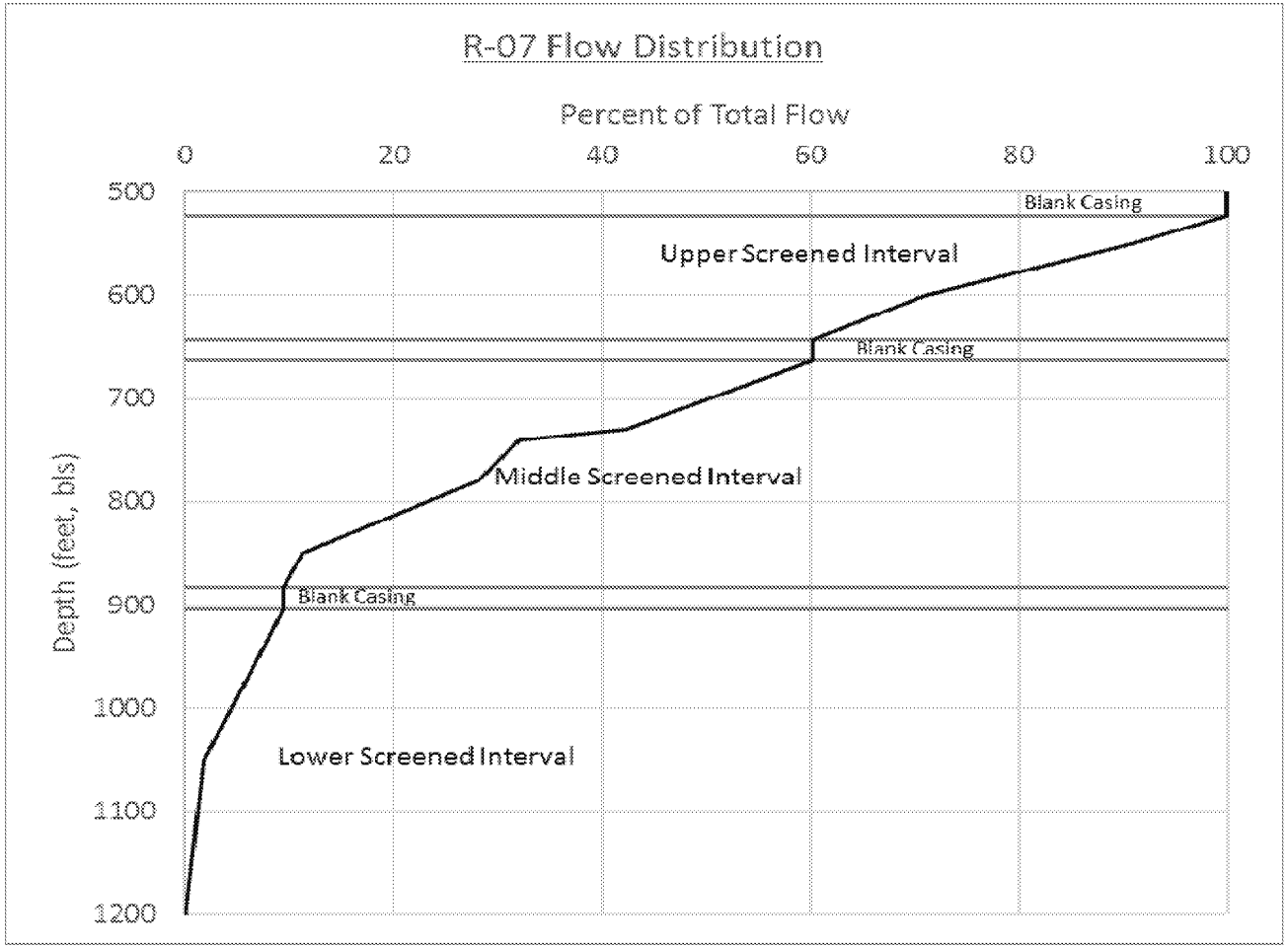
R-07 PUMPING TEST
HYDROGRAPHS AND DRAWDOWN TRENDS

JULY 2018

FIGURE 8

G:\Projects\Florence Copper\129687 PTF Well Drilling\Deliverables\Formation Testing Report\Figures\[Figure 08_R-07_Hyd



NOTES

bls = below land surface
Raw data are provided in Appendix A.

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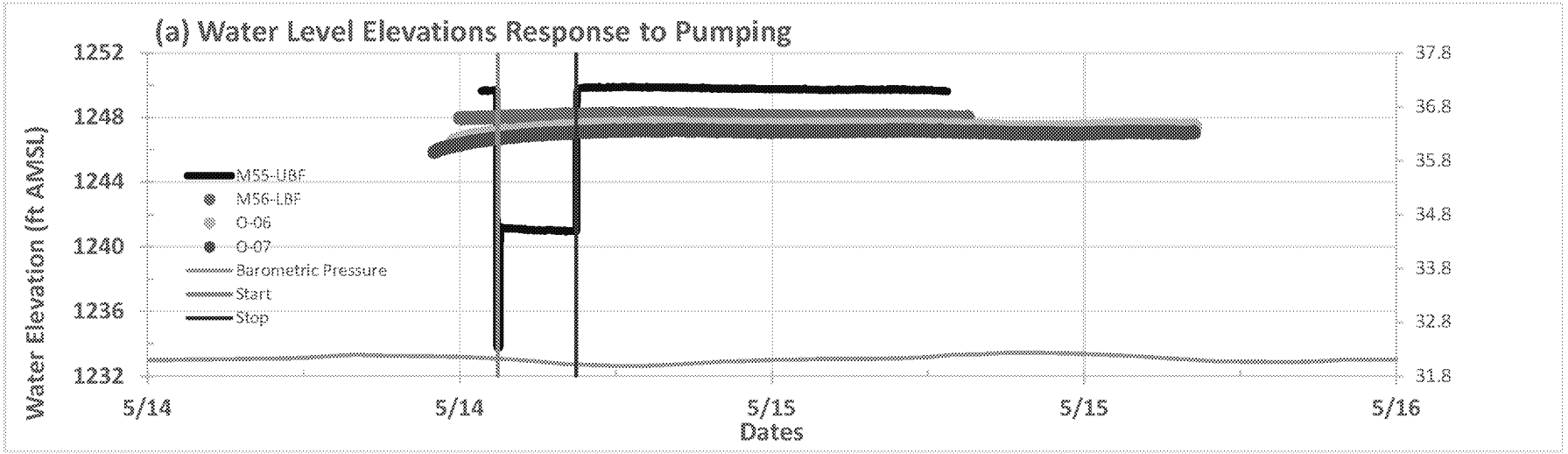
FLORENCE, ARIZONA

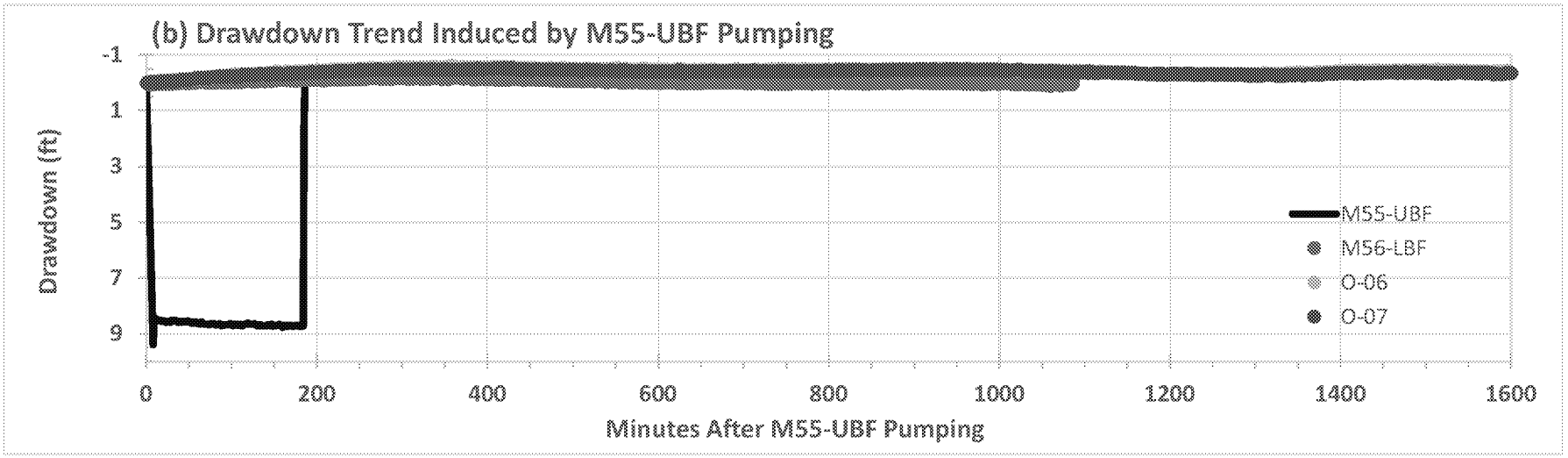
R-07 SPINNER FLOW PROFILING

JULY 2018

FIGURE 9

G:\Projects\Florence Copper\129687 PTF Well Drilling\Deliverables\Formation Testing Report\Figures\[Figure 09_R-07_Spi





NOTES

1. Transducer data are based on compensated values.
2. The magnitude of barometric pressure fluctuation is very small in comparison with the magnitude of drawdown; therefore, correction to the drawdown values is not needed.

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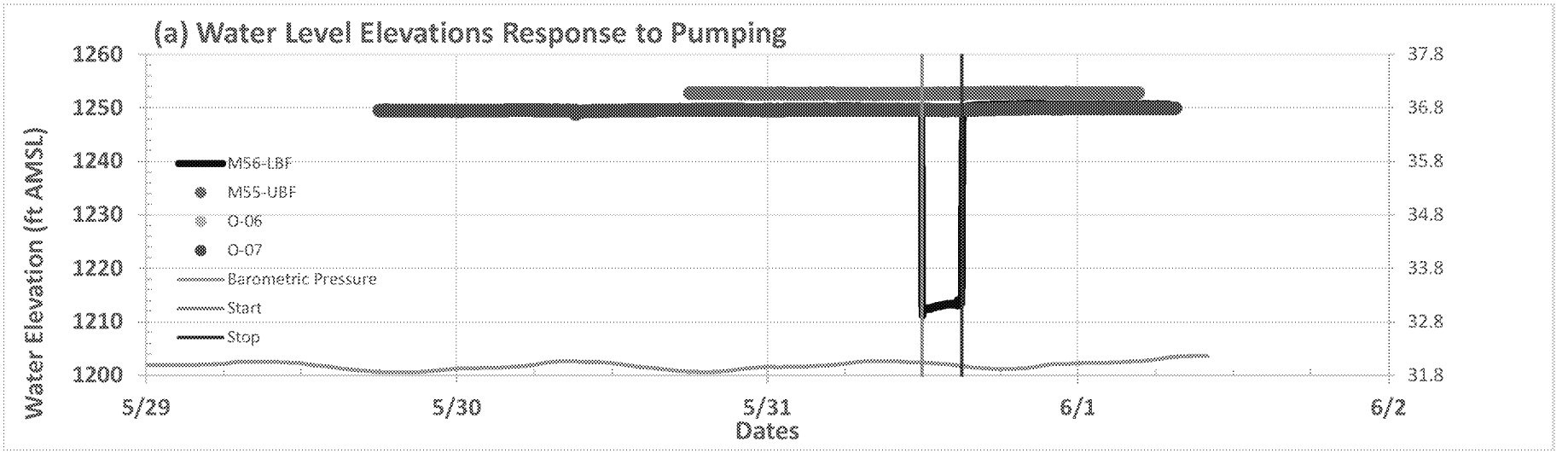
FLORENCE COPPER PROJECT
FLORENCE, ARIZONA

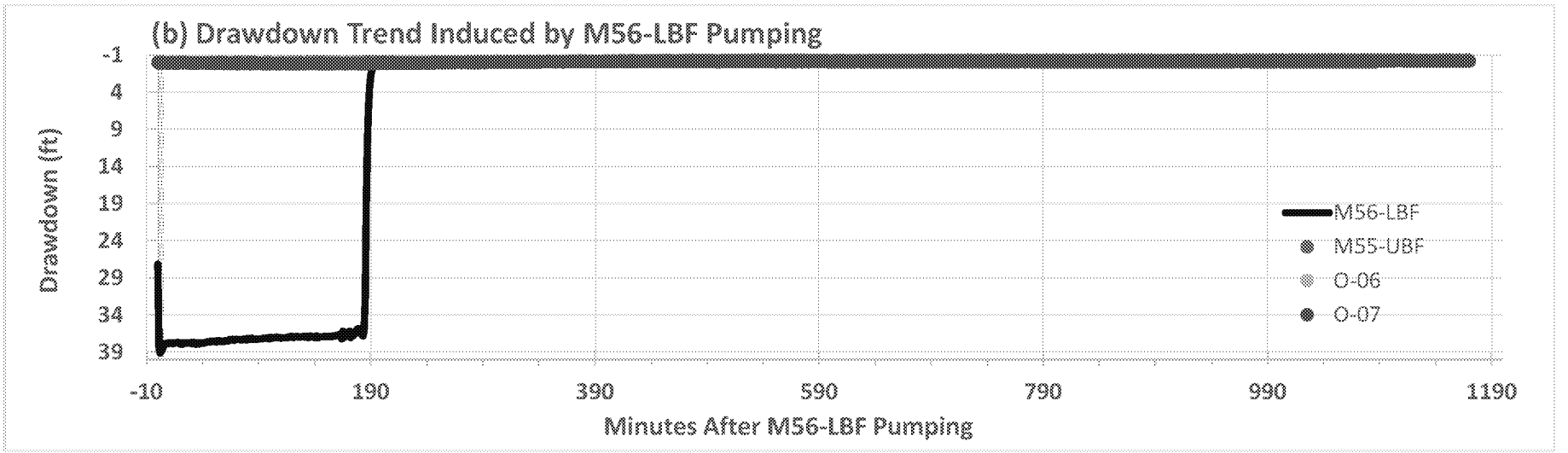
M55-UBF PUMPING TEST
HYDROGRAPHS AND DRAWDOWN TRENDS

JULY 2018

FIGURE 10

G:\Projects\Florence Copper\129687 PTF Well Drilling\Deliverables\Formation Testing Report\Figures\[Figure 10_M55-UBF





NOTES

1. Transducer data are based on compensated values.
2. The magnitude of barometric pressure fluctuation is very small in comparison with the magnitude of drawdown; therefore, correction to the drawdown values is not needed.

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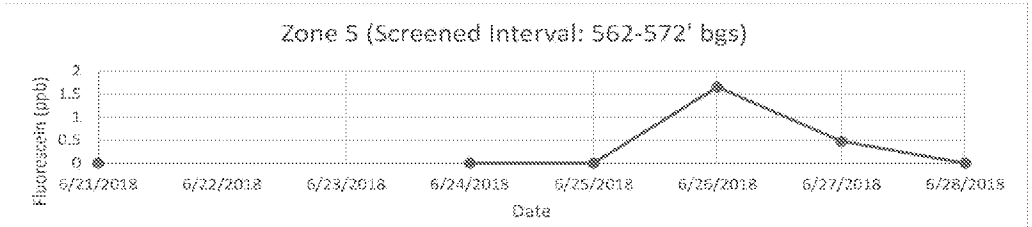
FLORENCE, ARIZONA

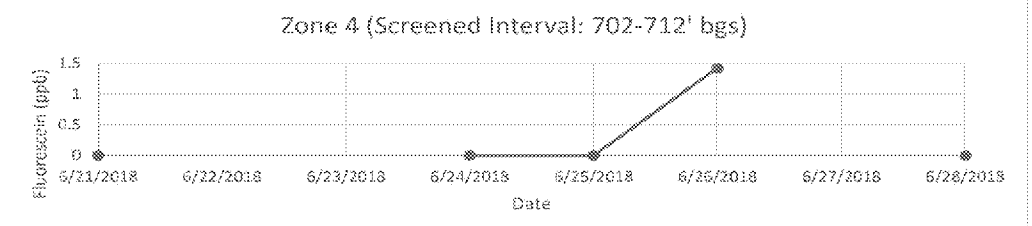
M56-LBF PUMPING TEST
HYDROGRAPHS AND DRAWDOWN TRENDS

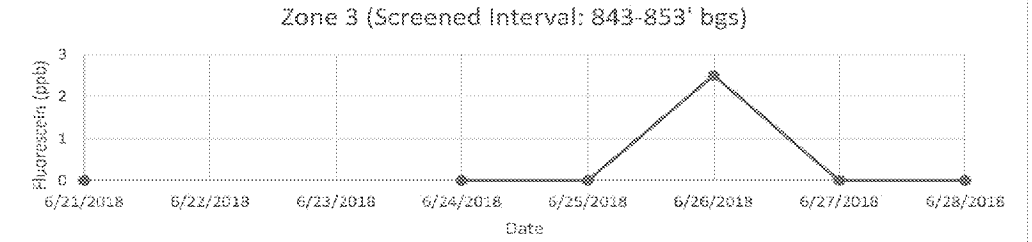
JULY 2018

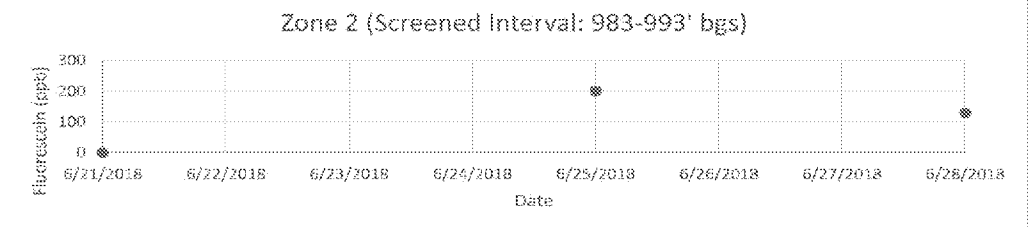
FIGURE 11

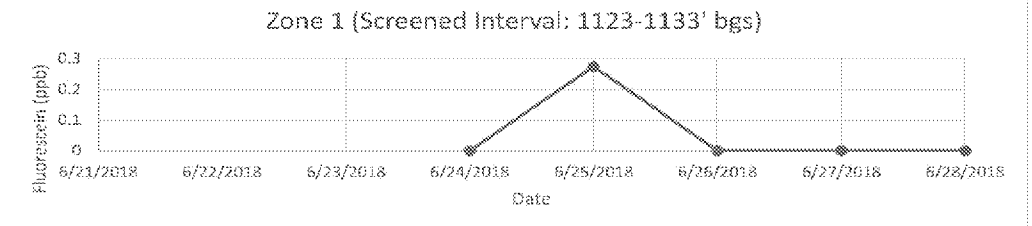
G:\Projects\Florence Copper\129687 PTF Well Drilling\Deliverables\Formation Testing Report\Figures\[Figure 11_M56-LBF_











NOTES

ppb = parts per billion (or µg/L)
bgs = below ground surface

HALEY ALDRICH

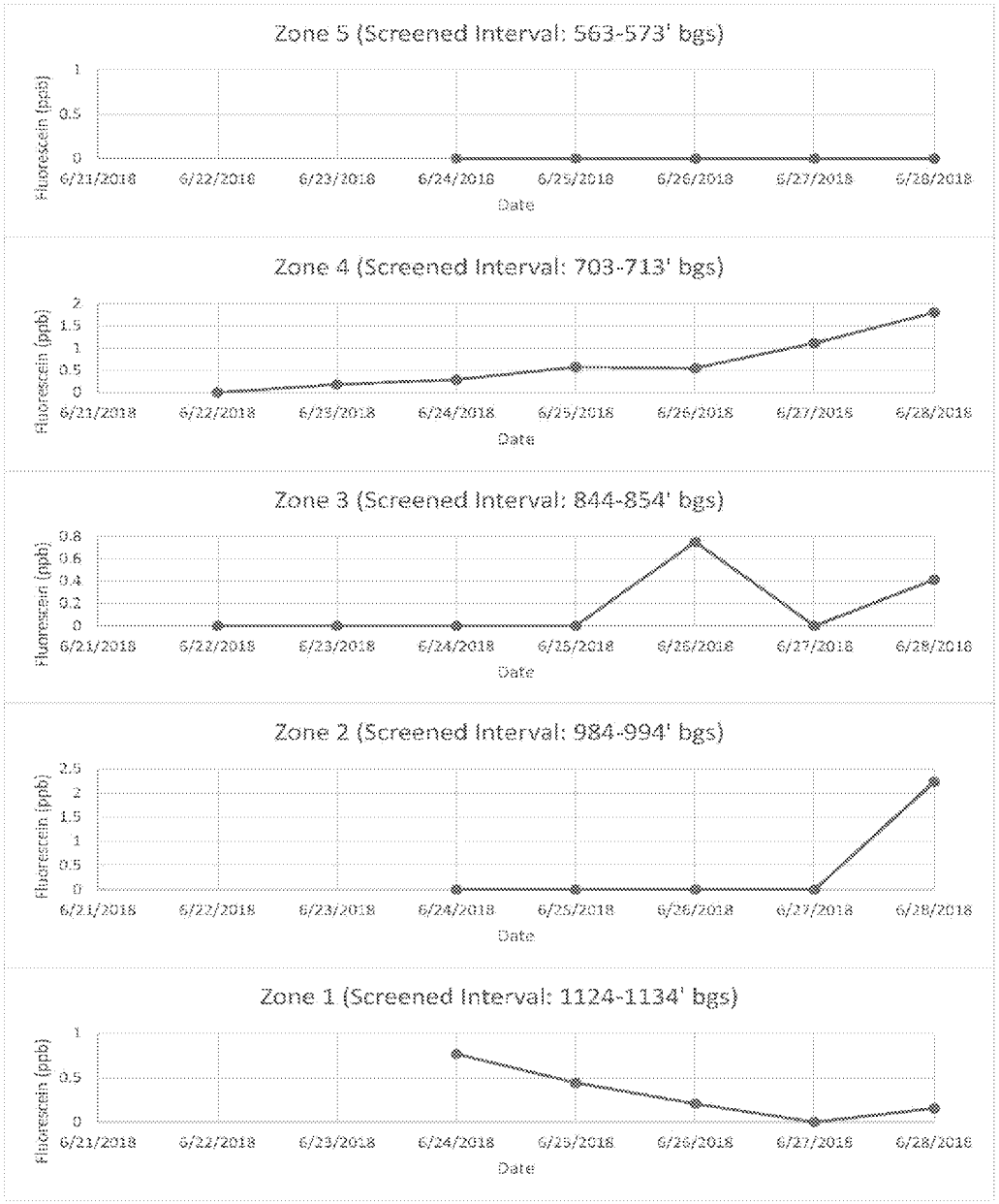
FLORENCE COPPER PROJECT
FLORENCE, ARIZONA

TRACER BREAKTHROUGH AT WB-01

JULY 2018

FIGURE 12

\\haleyaldrich.com\share\phx_common\Projects\Florence Copper\129687 PTF Well Drilling\Project Data\Field Data\Aquifer



NOTES

ppb = parts per billion (or ug/L)
bgs = below ground surface

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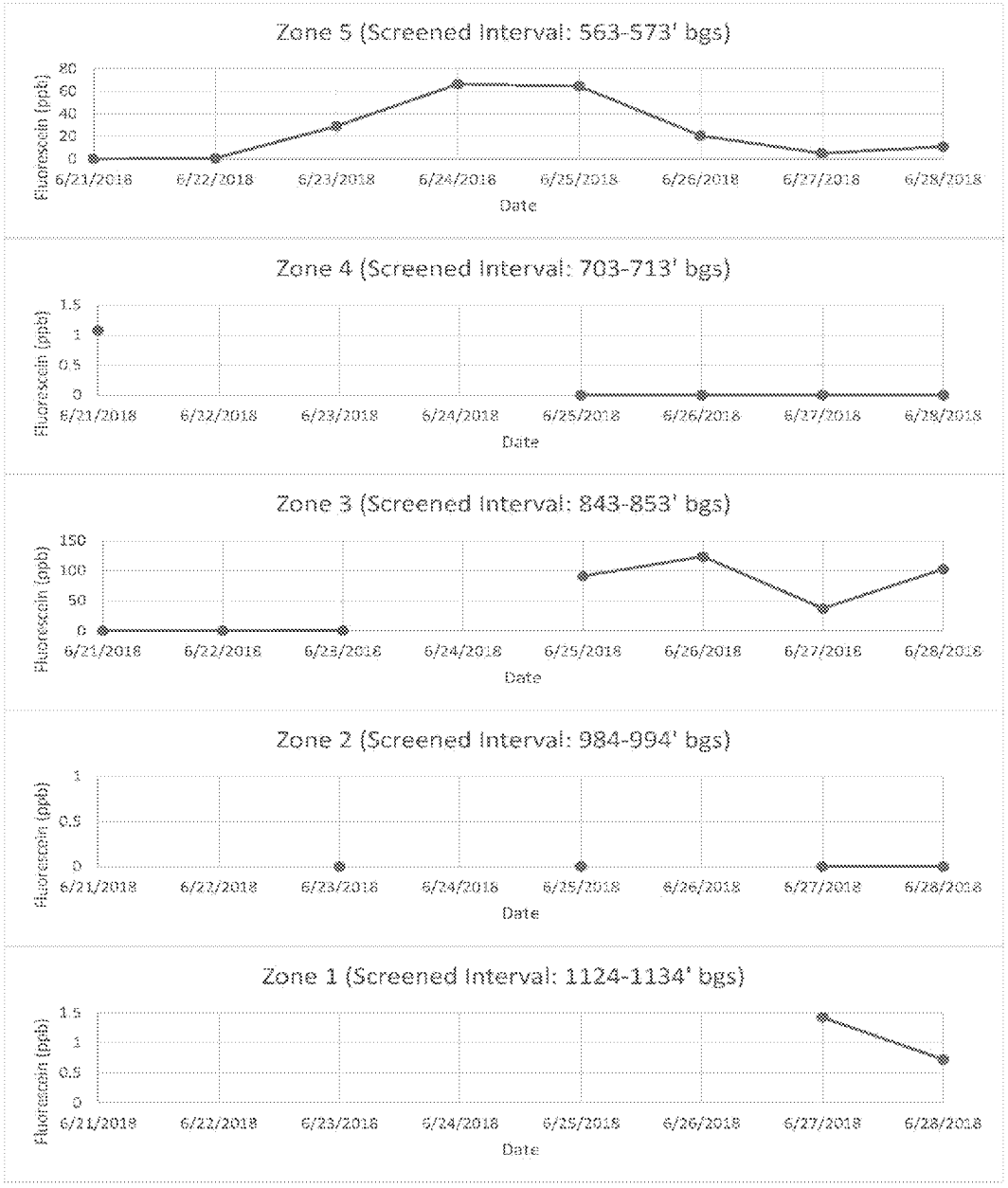
FLORENCE COPPER PROJECT
FLORENCE, ARIZONA

TRACER BREAKTHROUGH AT WB-02

JULY 2018

FIGURE 13

\\haleyaldrich.com\share\phx_common\Projects\Florence Copper\129687 PTF Well Drilling\Project Data\Field Data\Aquifer



NOTES

ppb = parts per billion (or ug/L)
bgs = below ground surface

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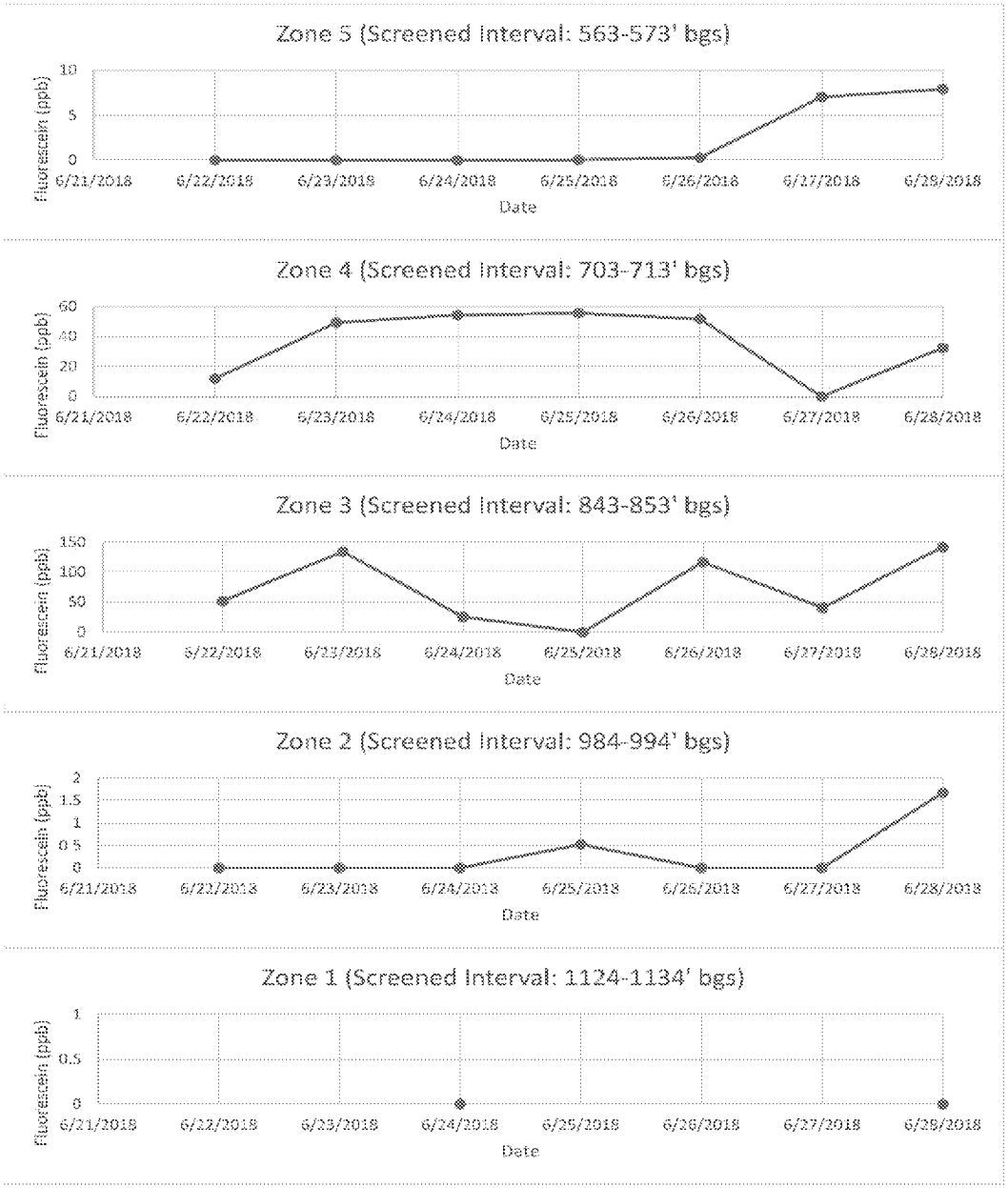
FLORENCE COPPER PROJECT
FLORENCE, ARIZONA

TRACER BREAKTHROUGH AT WB-03

JULY 2018

FIGURE 14

\\haleyaldrich.com\share\phx_common\Projects\Florence Copper\129687 PTF Well Drilling\Project Data\Field Data\Aquifer



NOTES

ppb = parts per billion (or ug/L)
bgs = below ground surface

HALEY ALDRICH

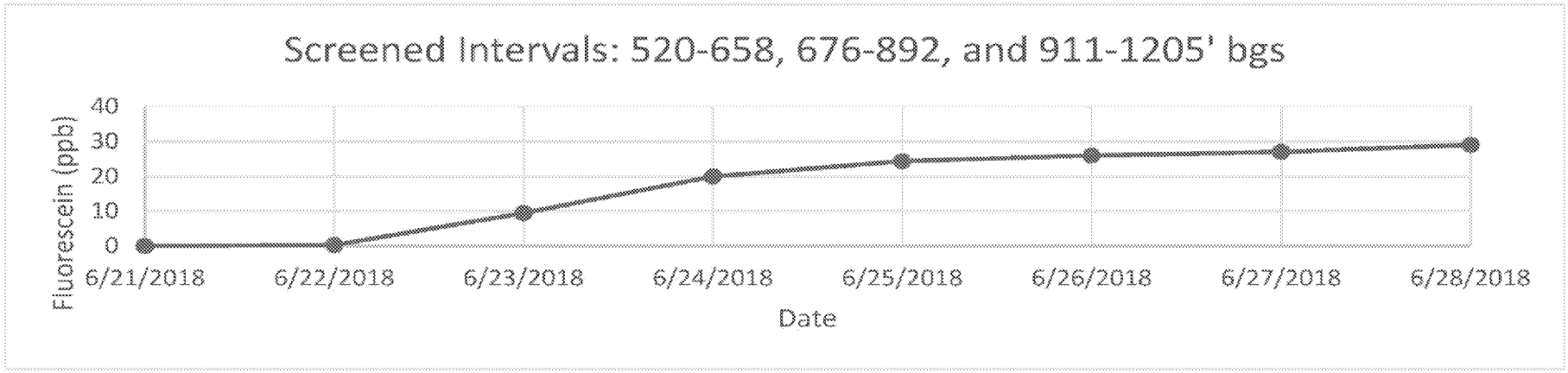
FLORENCE COPPER PROJECT
FLORENCE, ARIZONA

TRACER BREAKTHROUGH AT WB-04

JULY 2018

FIGURE 15

\\haleyaldrich.com\share\phx_common\Projects\Florence Copper\129687 PTF Well Drilling\Project Data\Field Data\Aquifer



NOTES

ppb = parts per billion (or µg/L)
bgs = below ground surface

HALEY ALDRICH

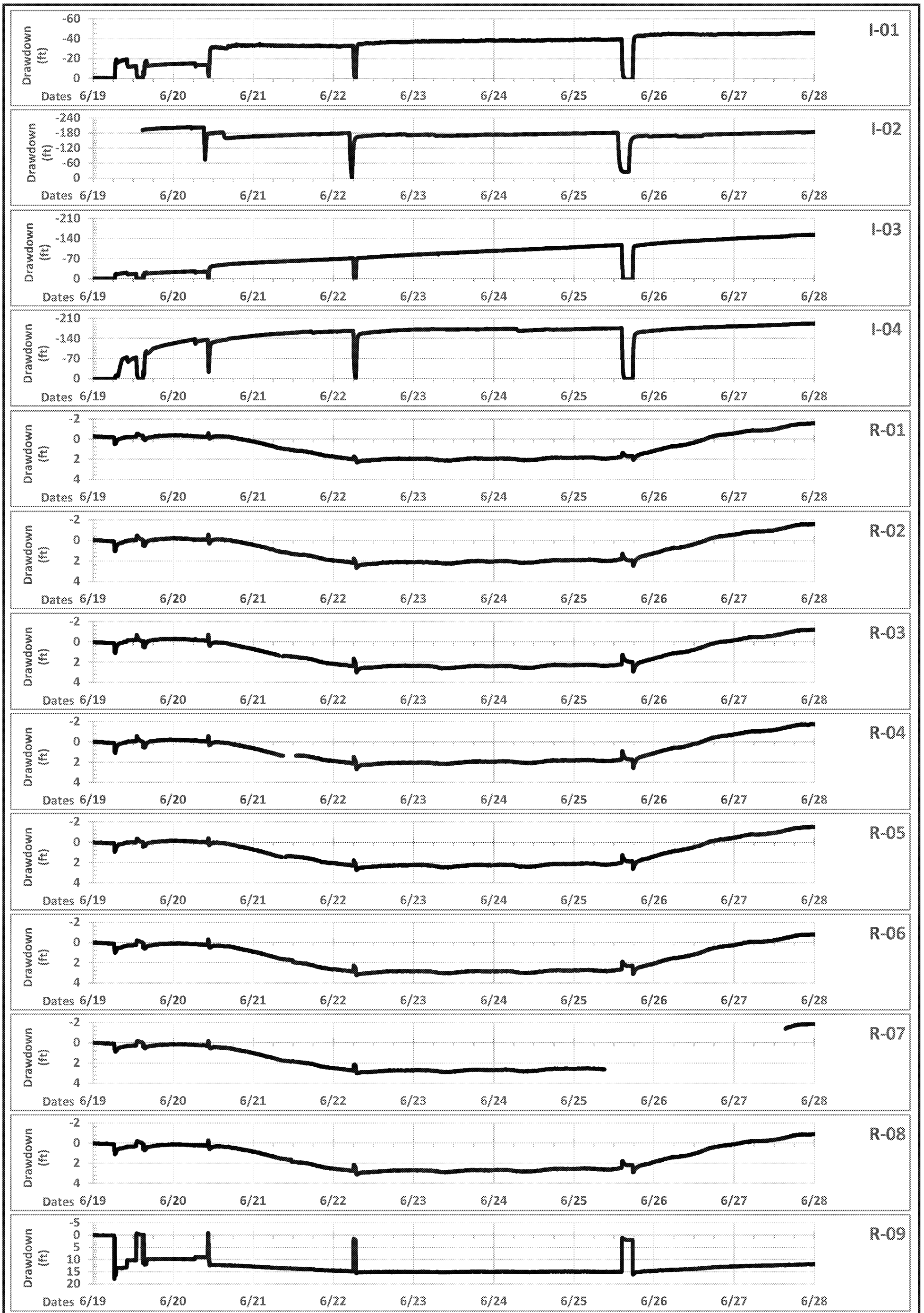
FLORENCE COPPER PROJECT
FLORENCE, ARIZONA

TRACER BREAKTHROUGH AT R-09

JULY 2018

FIGURE 16

\\haleyaldrich.com\share\phx_common\Projects\Florence Copper\129687 PTF Well Drilling\Project Data\Field Data\Aquifer



NOTES
1. Transducer data are based on compensated values. Drawdown data based on water head above transducer data.
2. ft = feet

HALEY ALDRICH

FLORENCE COPPER
FLORENCE, ARIZONA

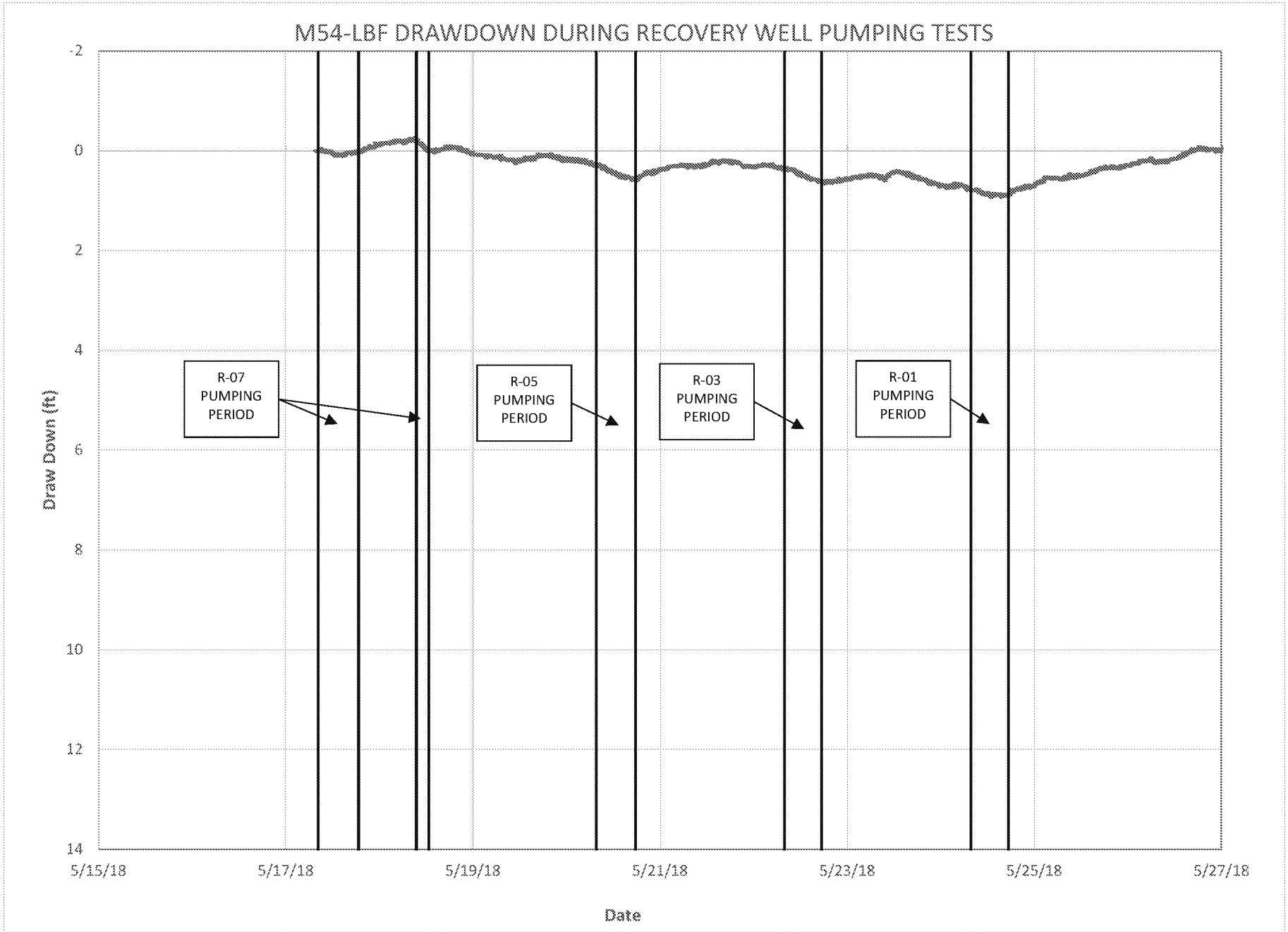
TRACER TEST HYDROGRAPHS

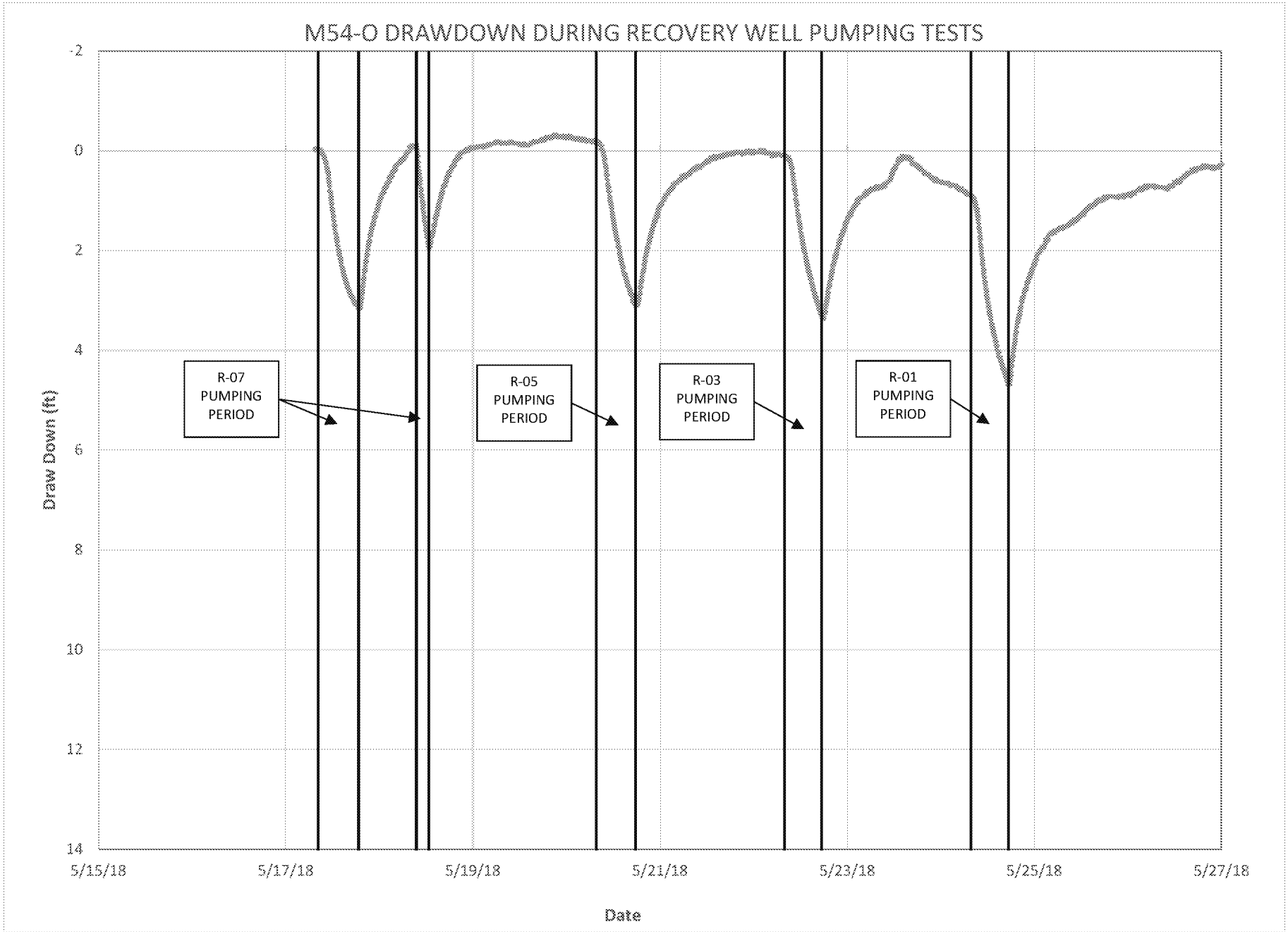
JULY 2018

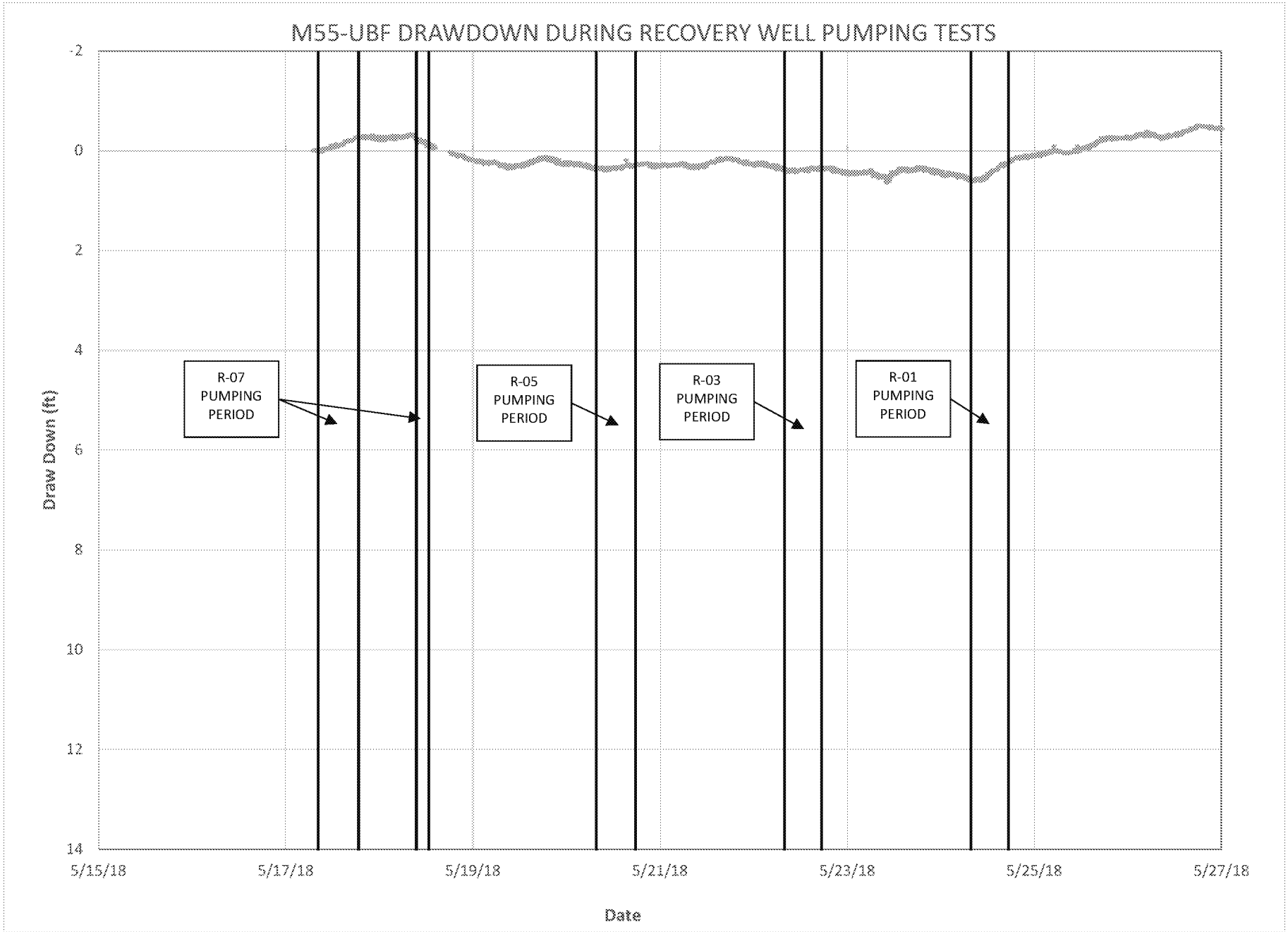
FIGURE 17

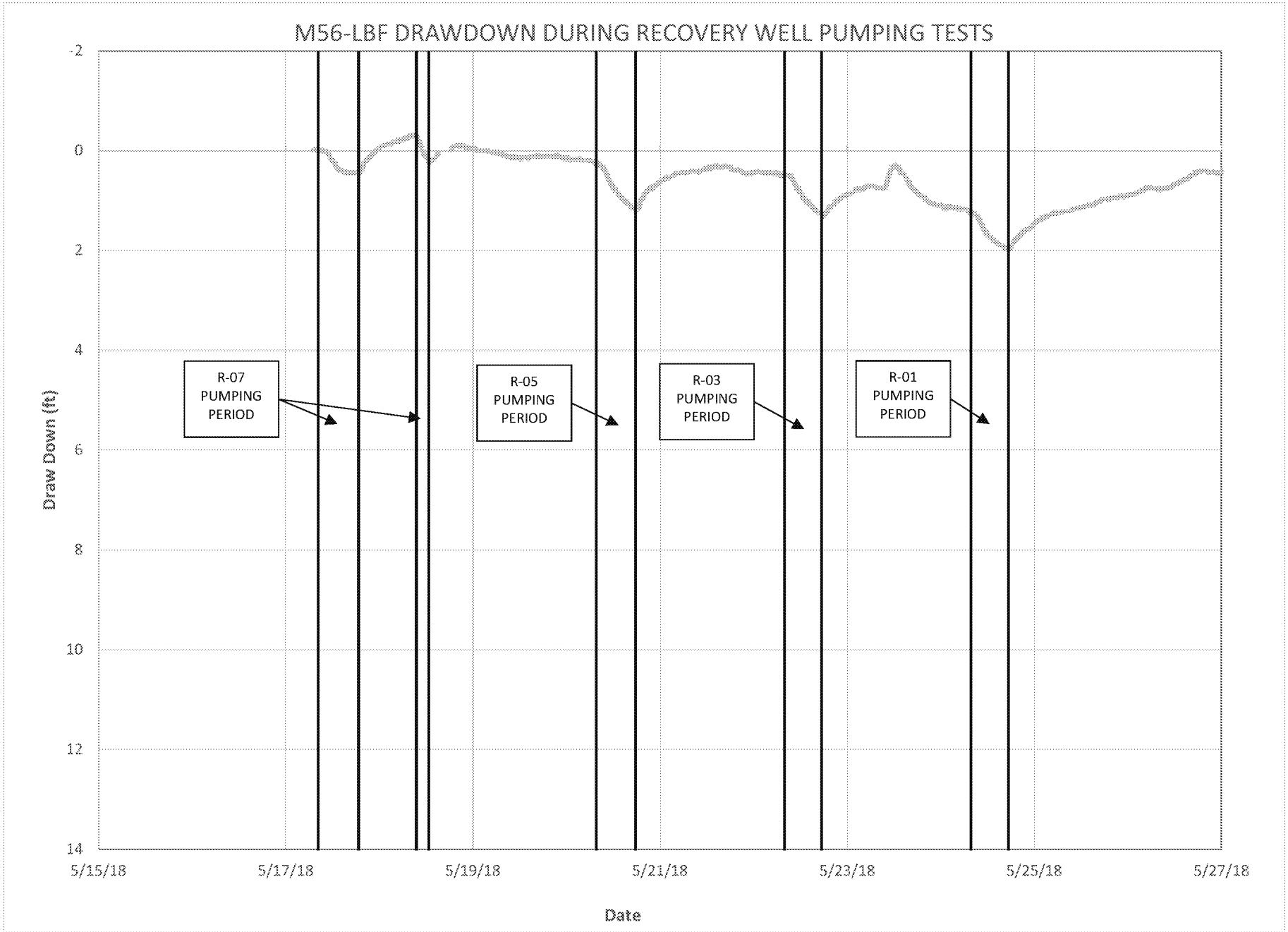
APPENDIX A

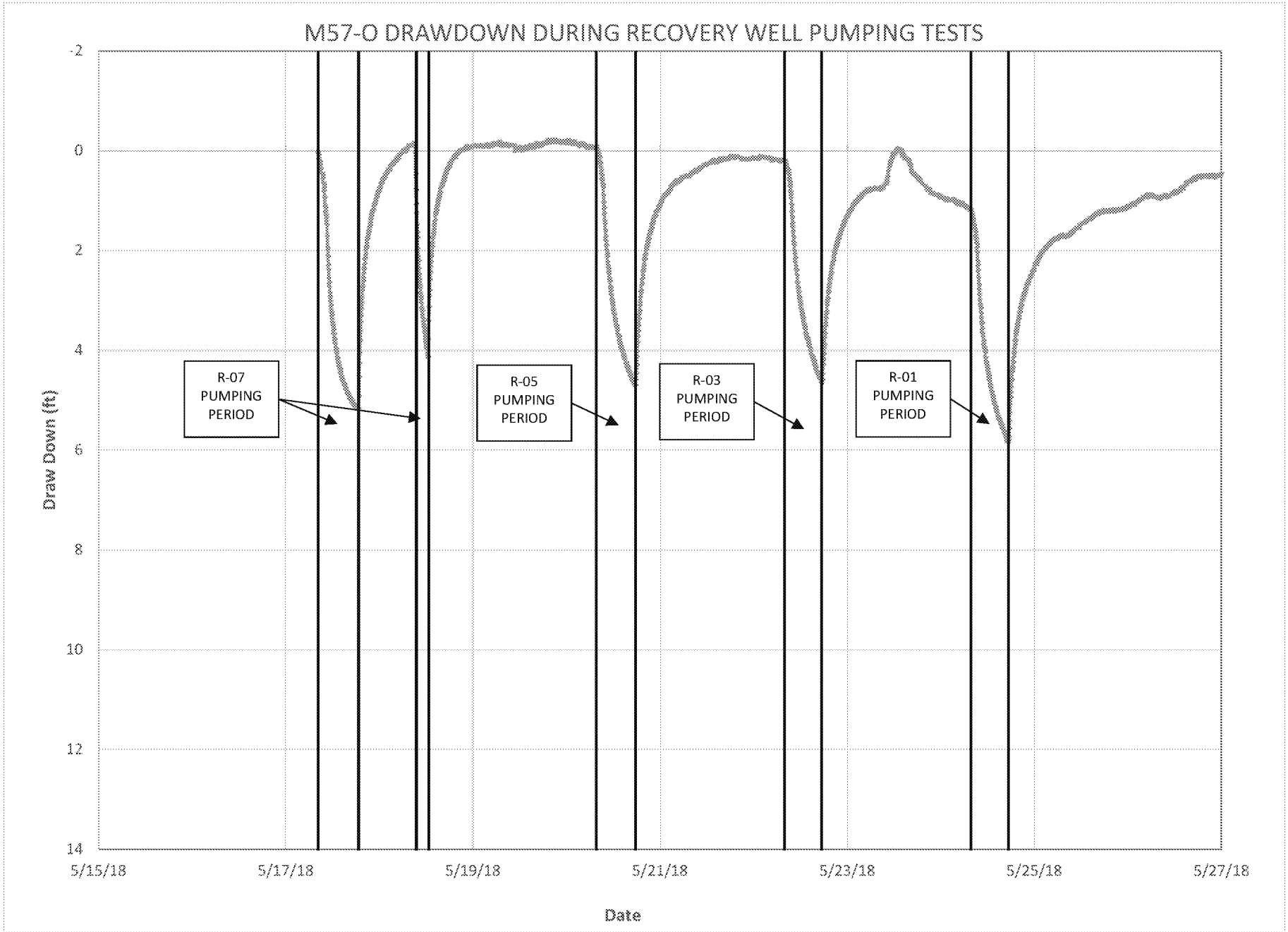
Monitoring Well Hydrographs

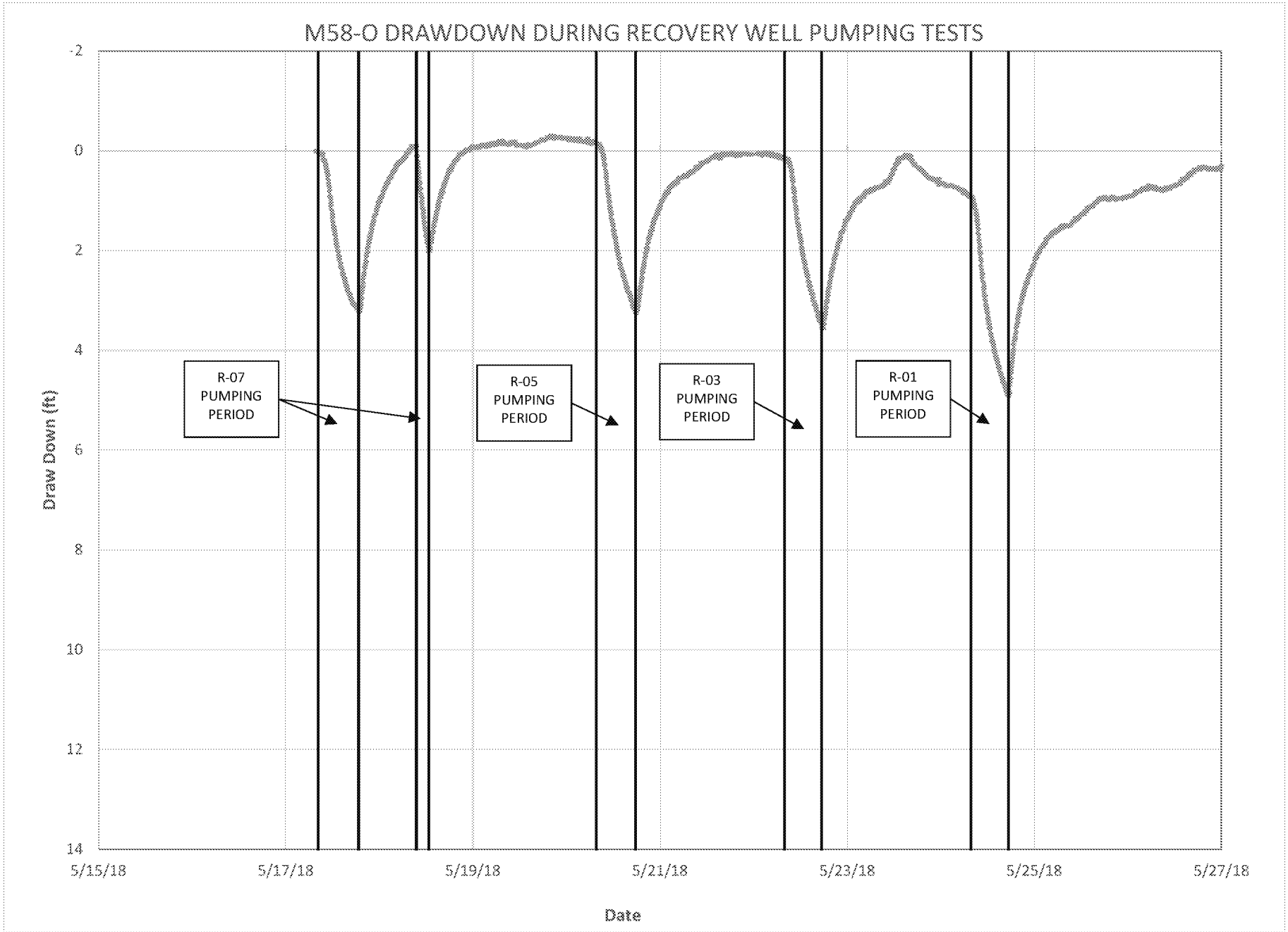

M54-LBF DRAWDOWN DURING RECOVERY WELL PUMPING TESTS
-2
0
2
4
6
8
10
12
14
Draw Down (ft)
R-07 PUMPING PERIOD
R-05 PUMPING PERIOD
R-03 PUMPING PERIOD
R-01 PUMPING PERIOD
5/15/18
5/17/18
5/19/18
5/21/18
5/23/18
5/25/18
5/27/18
Date

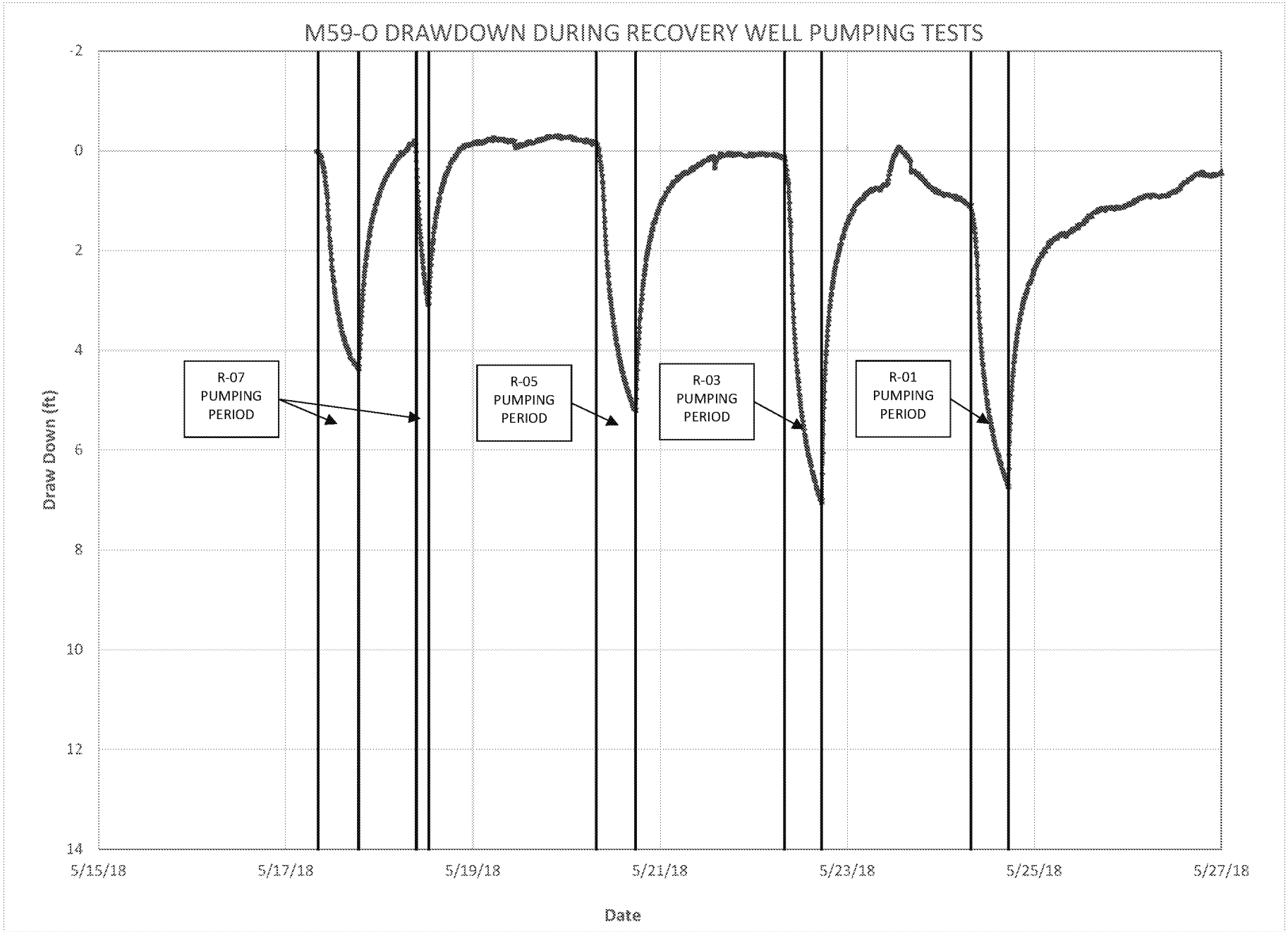

M54-O DRAWDOWN DURING RECOVERY WELL PUMPING TESTS
-2
0
2
4
6
8
10
12
14
Draw Down (ft)
R-07 PUMPING PERIOD
R-05 PUMPING PERIOD
R-03 PUMPING PERIOD
R-01 PUMPING PERIOD
5/15/18
5/17/18
5/19/18
5/21/18
5/23/18
5/25/18
5/27/18
Date

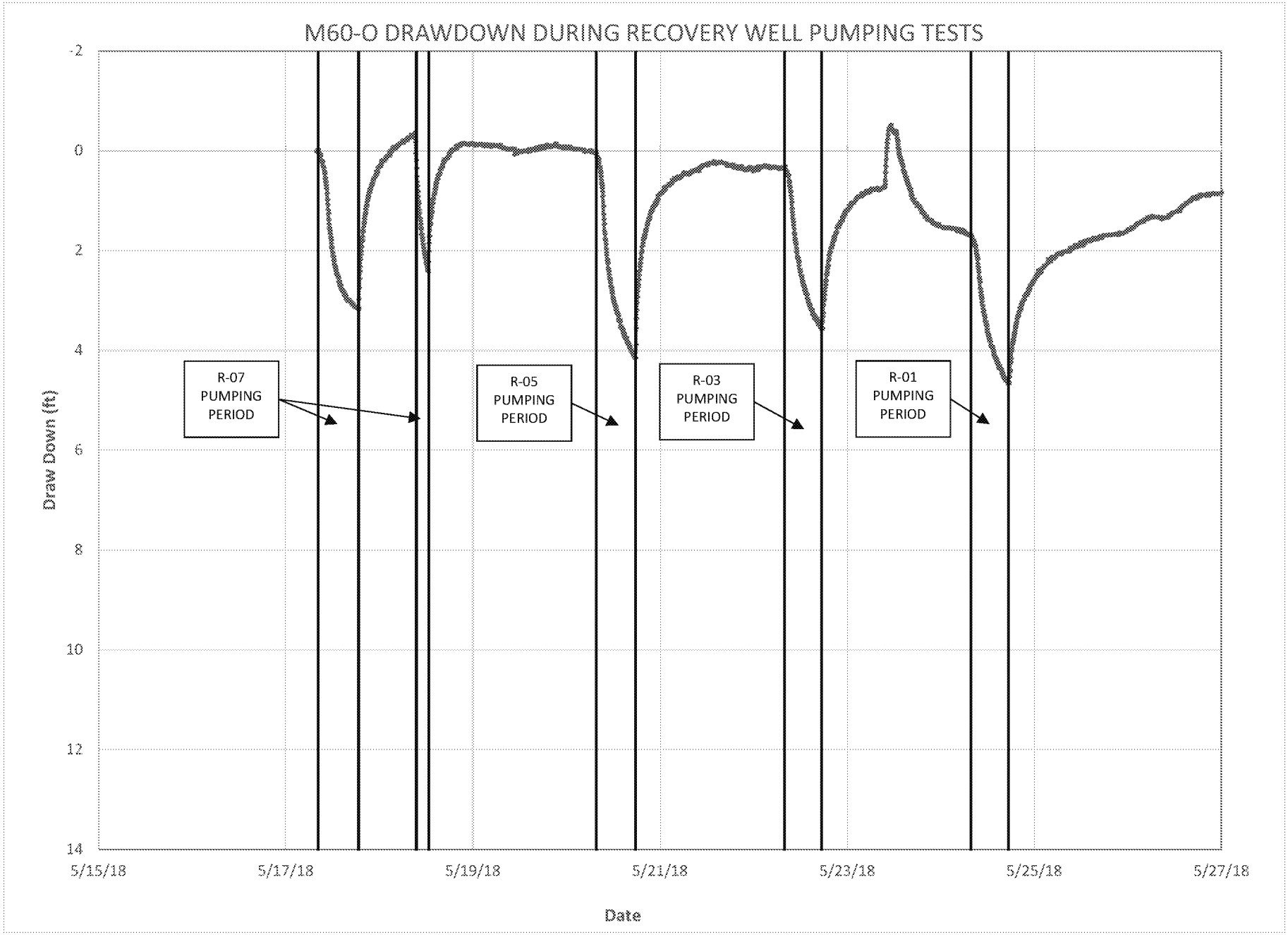

M55-UBF DRAWDOWN DURING RECOVERY WELL PUMPING TESTS
-2
0
2
4
6
8
10
12
14
Draw Down (ft)
R-07 PUMPING PERIOD
R-05 PUMPING PERIOD
R-03 PUMPING PERIOD
R-01 PUMPING PERIOD
5/15/18
5/17/18
5/19/18
5/21/18
5/23/18
5/25/18
5/27/18
Date

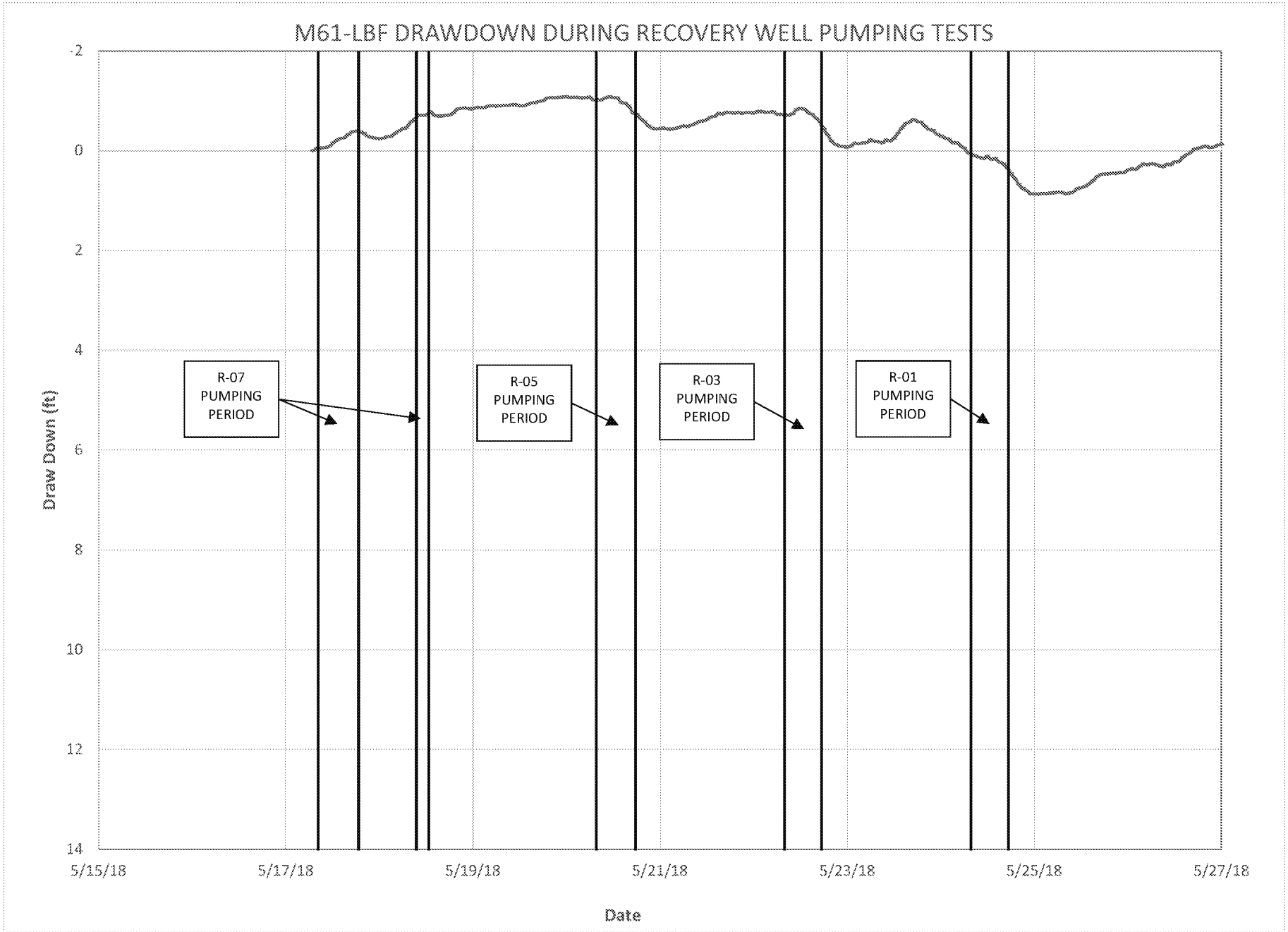

M56-LBF DRAWDOWN DURING RECOVERY WELL PUMPING TESTS
-2
0
2
4
6
8
10
12
14
Draw Down (ft)
R-07 PUMPING PERIOD
R-05 PUMPING PERIOD
R-03 PUMPING PERIOD
R-01 PUMPING PERIOD
5/15/18
5/17/18
5/19/18
5/21/18
5/23/18
5/25/18
5/27/18
Date

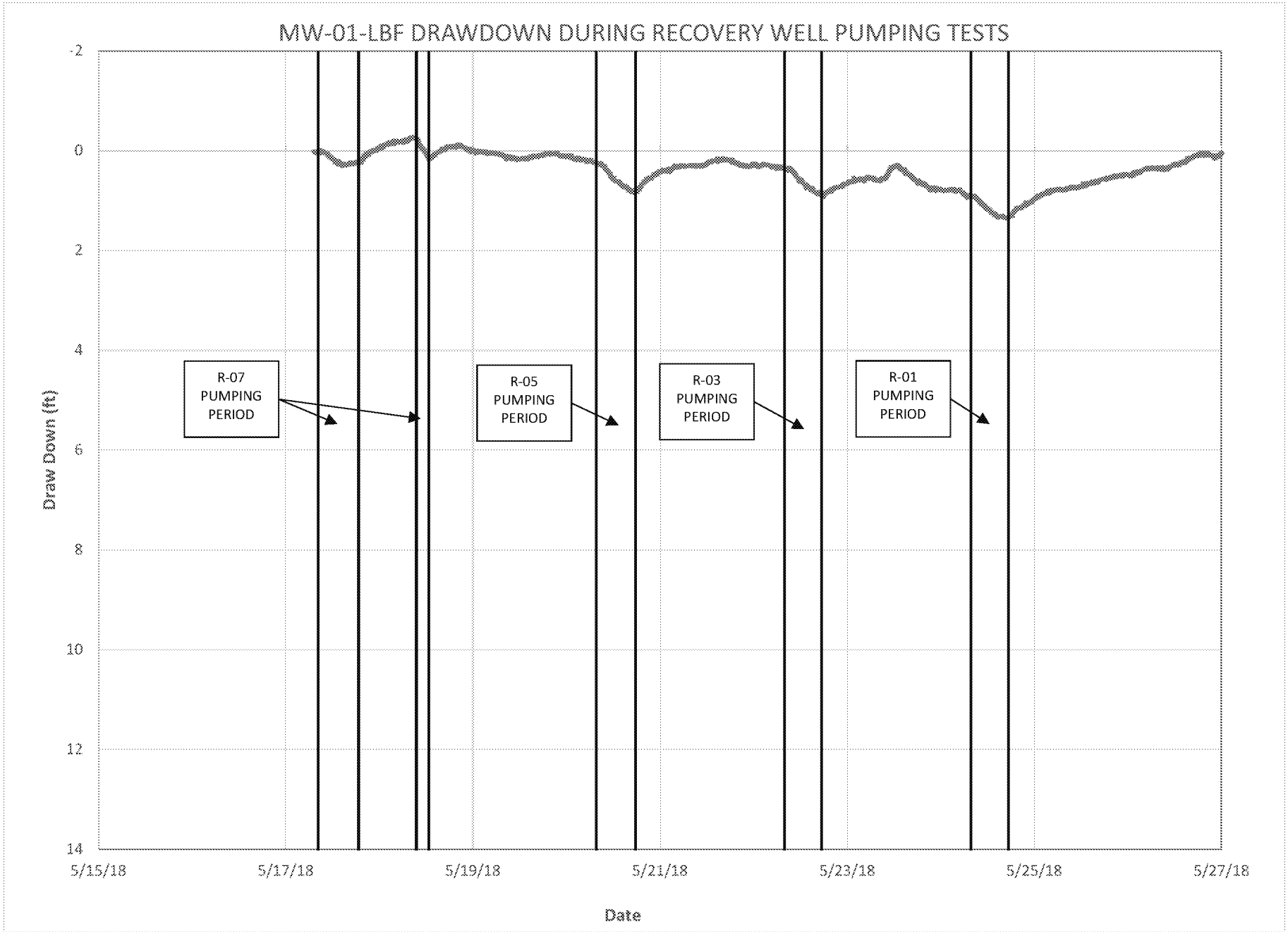

M57-O DRAWDOWN DURING RECOVERY WELL PUMPING TESTS
-2
0
2
4
6
8
10
12
14
Draw Down (ft)
R-07 PUMPING PERIOD
R-05 PUMPING PERIOD
R-03 PUMPING PERIOD
R-01 PUMPING PERIOD
5/15/18
5/17/18
5/19/18
5/21/18
5/23/18
5/25/18
5/27/18
Date

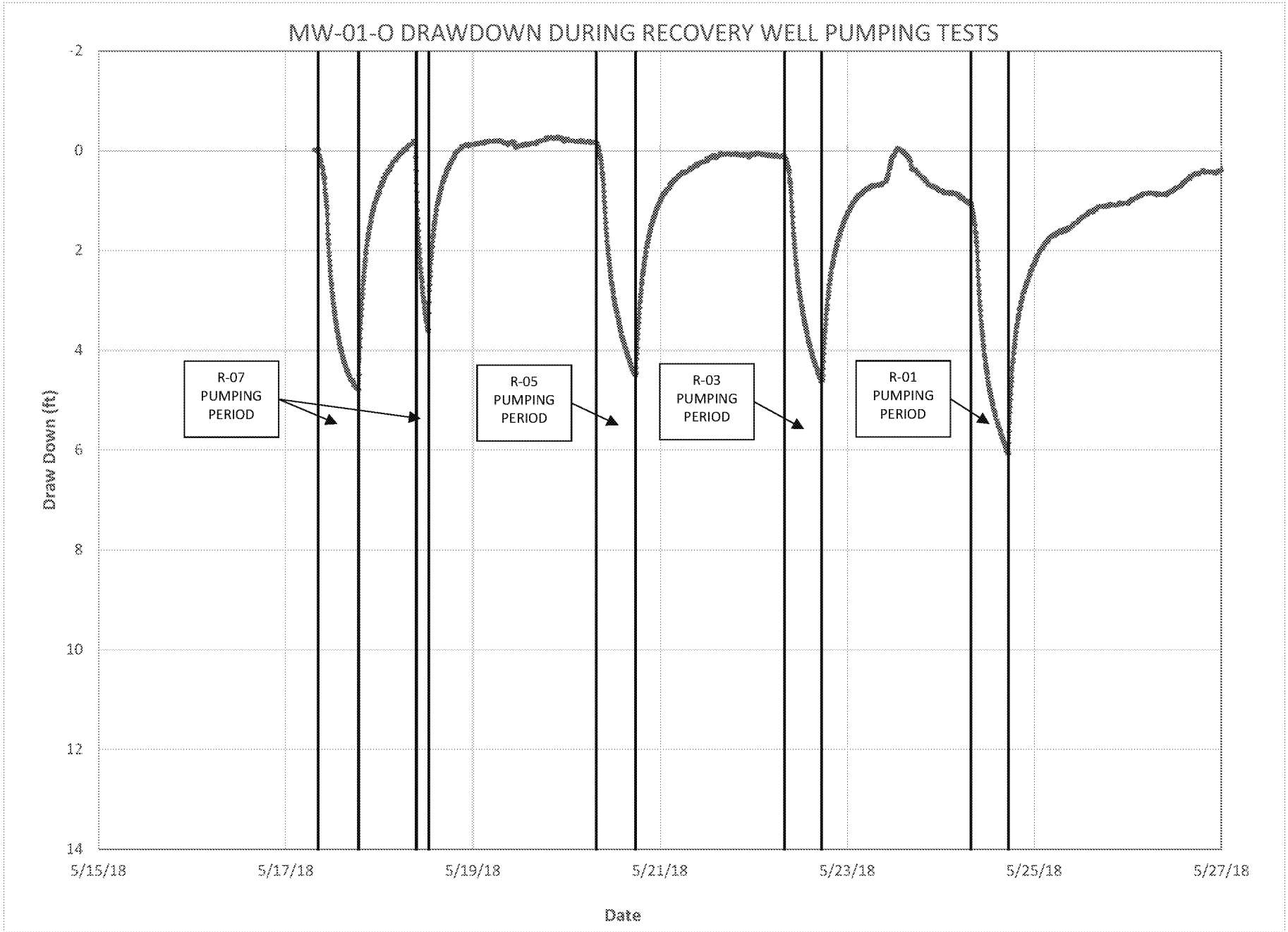

M58-O DRAWDOWN DURING RECOVERY WELL PUMPING TESTS
-2
0
2
4
6
8
10
12
14
Draw Down (ft)
R-07 PUMPING PERIOD
R-05 PUMPING PERIOD
R-03 PUMPING PERIOD
R-01 PUMPING PERIOD
5/15/18
5/17/18
5/19/18
5/21/18
5/23/18
5/25/18
5/27/18
Date


M59-O DRAWDOWN DURING RECOVERY WELL PUMPING TESTS
-2
0
2
4
6
8
10
12
14
Draw Down (ft)
R-07 PUMPING PERIOD
R-05 PUMPING PERIOD
R-03 PUMPING PERIOD
R-01 PUMPING PERIOD
5/15/18
5/17/18
5/19/18
5/21/18
5/23/18
5/25/18
5/27/18
Date


M60-O DRAWDOWN DURING RECOVERY WELL PUMPING TESTS
-2
0
2
4
6
8
10
12
14
Draw Down (ft)
R-07 PUMPING PERIOD
R-05 PUMPING PERIOD
R-03 PUMPING PERIOD
R-01 PUMPING PERIOD
5/15/18
5/17/18
5/19/18
5/21/18
5/23/18
5/25/18
5/27/18
Date


M61-LBF DRAWDOWN DURING RECOVERY WELL PUMPING TESTS
-2
0
2
4
6
8
10
12
14
Draw Down (ft)
R-07 PUMPING PERIOD
R-05 PUMPING PERIOD
R-03 PUMPING PERIOD
R-01 PUMPING PERIOD
5/15/18
5/17/18
5/19/18
5/21/18
5/23/18
5/25/18
5/27/18
Date


MW-01-LBF DRAWDOWN DURING RECOVERY WELL PUMPING TESTS
-2
0
2
4
6
8
10
12
14
Draw Down (ft)
R-07 PUMPING PERIOD
R-05 PUMPING PERIOD
R-03 PUMPING PERIOD
R-01 PUMPING PERIOD
5/15/18
5/17/18
5/19/18
5/21/18
5/23/18
5/25/18
5/27/18
Date


MW-01-O DRAWDOWN DURING RECOVERY WELL PUMPING TESTS
-2
0
2
4
6
8
10
12
14
Draw Down (ft)
R-07 PUMPING PERIOD
R-05 PUMPING PERIOD
R-03 PUMPING PERIOD
R-01 PUMPING PERIOD
5/15/18
5/17/18
5/19/18
5/21/18
5/23/18
5/25/18
5/27/18
Date

APPENDIX B

Spinner Flow Profiling Raw Data

Southwest Exploration Services, LLC

borehole geophysics & video services

COMPANY	FLORENCE COPPER
WELL ID	R-01
FIELD	FLORENCE COPPER
COUNTY	PINAL
STATE	ARIZONA

TYPE OF LOGS: DYNAMIC SPINNER

MORE:

LOCATION

SEC TWP RGE

OTHER SERVICES NONE

PERMANENT DATUM		ELEVATION	K.B.
LOG MEAS. FROM	GROUND LEVEL	ABOVE PERM. DATUM	D.F.
DRILLING MEAS. FROM	GROUND LEVEL		G.L.

DATE	5-24-18	TYPE FLUID IN HOLE	FORMATION WATER
RUN No	1	MUD WEIGHT	N/A
TYPE LOG	DYNAMIC SPINNER	VISCOSITY	N/A
DEPTH-DRILLER	1200 FT.	LEVEL	N/A
DEPTH-LOGGER	1190 FT.	MAX. REC. TEMP.	N/A
BTM LOGGED INTERVAL	1180 FT.	IMAGE ORIENTED TO:	N/A
TOP LOGGED INTERVAL	480 FT.	SAMPLE INTERVAL	0.2 FT.
DRILLER / RIG#	HYDRO RESOURCES	LOGGING TRUCK	TRUCK #200
RECORDED BY / Logging Eng.	A. OLSON	TOOL STRING/SN	MSI SFM SPINNER SN 5726
WITNESSED BY	COLLIN - H&A	LOG TIME:ON SITE/OFF SITE	9:30 A.M.

RUN	BOREHOLE RECORD			CASING RECORD			
NO.	BIT	FROM	TO	SIZE	WGT.	FROM	TO
1	?	SURFACE	40 FT.	14 IN.	STEEL	SURFACE	500 FT.
2	20 IN.	40 FT	506 FT.	5 IN.	FG	SURFACE	500 FT.
3	12 1/4 IN.	506 FT.	TOTAL DEPTH	5 IN.	PVC	500 FT.	TOTAL DEPTH

COMMENTS:

.

Tool Summary:

Date	5-24-18	Date		Date	
Run No.	1	Run No.	2	Run No.	3
Tool Model	MSI SFM SPINNER	Tool Model		Tool Model	
Tool SN	5726	Tool SN		Tool SN	
From	480 FT.	From		From	
To	1180 FT.	To		To	
Recorded By	A. OLSON	Recorded By		Recorded By	
Truck No	200	Truck No		Truck No	
Operation Check	5-14-18	Operation Check		Operation Check	
Calibration Check	5-14-18	Calibration Check		Calibration Check	
Time Logged	11:00 A.M.	Time Logged		Time Logged	

Date		Date		Date	
Run No.	4	Run No.	5	Run No.	6
Tool Model		Tool Model		Tool Model	
Tool SN		Tool SN		Tool SN	
From		From		From	
To		To		To	
Recorded By		Recorded By		Recorded By	
Truck No		Truck No		Truck No	
Operation Check		Operation Check		Operation Check	
Calibration Check		Calibration Check		Calibration Check	
Time Logged		Time Logged		Time Logged	

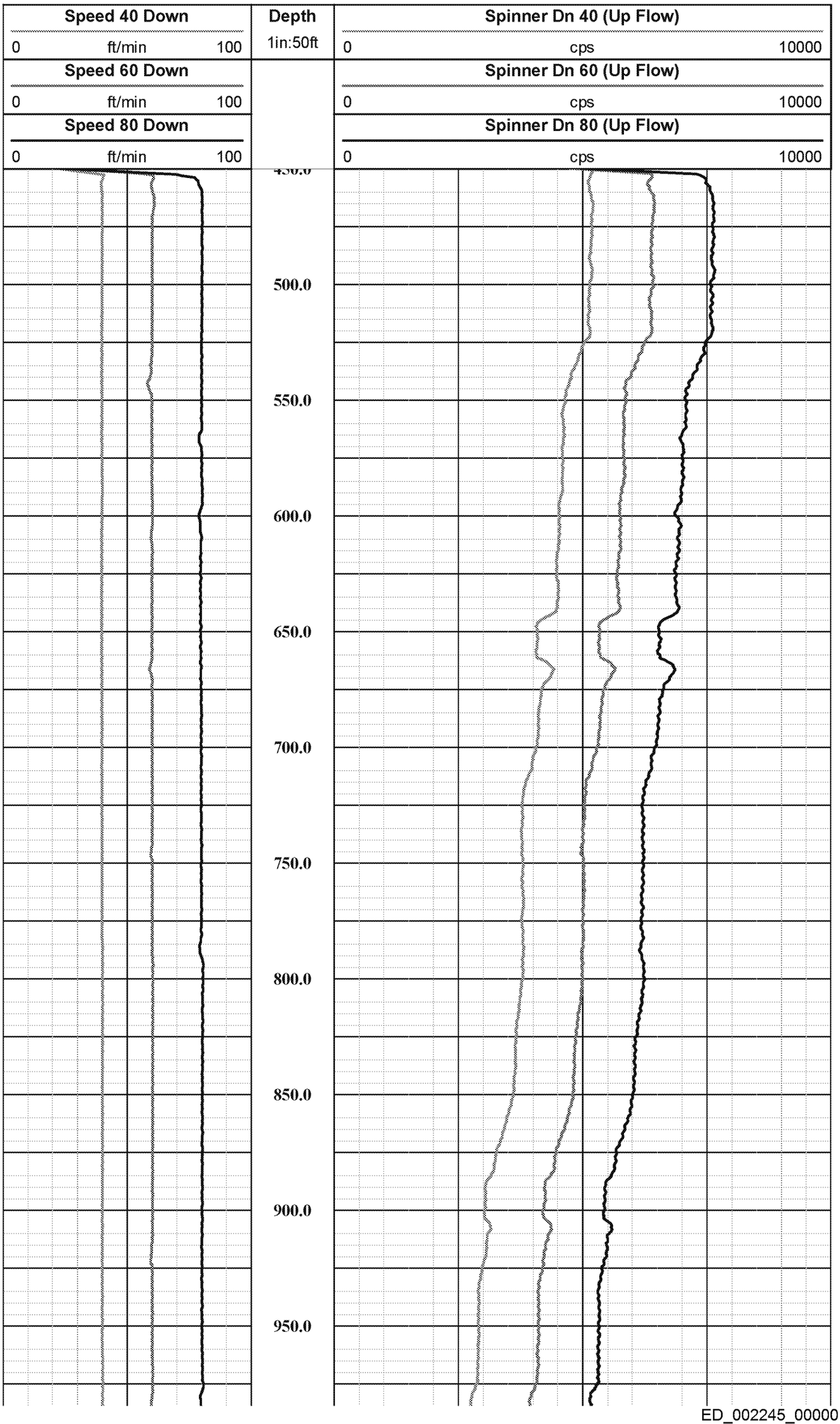
Additional Comments:

Caliper Arms Used: N/A **Calibration Points:** N/A

E-Log Calibration Range: N/A **Calibration Points:** N/A

Disclaimer:

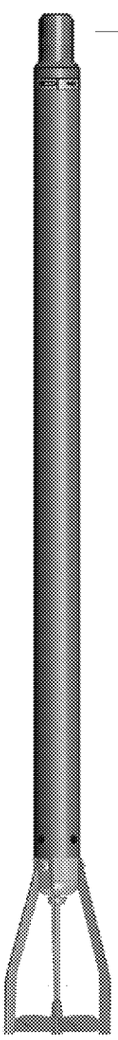
All interpretations of log data are opinions based on inferences from electrical or other measurements. We do not guarantee the accuracy or correctness of any interpretations or recommendations and shall not be liable or responsible for any loss, costs, damages, or expenses incurred or sustained by anyone resulting from any interpretation made by any of our employees or agents. These interpretations are also subject to our general terms and conditions set out in our current Service Invoice.


Speed 40 Down
0 ft/min 100
Speed 60 Down
0 ft/min 100
Speed 80 Down
0 ft/min 100
Depth
1in:50ft
Spinner Dn 40 (Up Flow)
0 cps 10000
Spinner Dn 60 (Up Flow)
0 cps 10000
Spinner Dn 80 (Up Flow)
0 cps 10000
500.0
550.0
600.0
650.0
700.0
750.0
800.0
850.0
900.0
950.0

0 ft/min 100 **Speed 80 Down**		0 cps 10000 **Spinner Dn 80 (Up Flow)**
0 ft/min 100 **Speed 60 Down**		0 cps 10000 **Spinner Dn 60 (Up Flow)**
0 ft/min 100 **Speed 40 Down**	1in:50ft **Depth**	0 cps 10000 **Spinner Dn 40 (Up Flow)**

MSI QL-40 Spinner Flowmeter (SFM) SN 5726

Probe Top = Depth Ref.



Single Conductor MSI Probe Top

Probe Length = 0.90 m or 2.95 ft
Probe Weight = 3.25 kg or 7.2 lbs

Operating Temperature: 80 Deg C (176 Deg F)

Presure Rating: 200 bar (2900 psi)

Two impeller cage sizes: 3" and 4"

Tool is run centeralized. Depending on well diamter, a weight bar may be added to the assembly.

Can be used in static wells or under pumping conditions.

Measures both upflow and downflow.

Minimum Flow Rate: 3-5 gpm
Maximum Flow Rate: 5000 gpm

1.57" or 40 mm Diameter (Cage dependent)

Southwest Exploration Services, LLC

borehole geophysics & video services

Company	FLORENCE COPPER
Well	R-01
Field	FLORENCE COPPER
County	PINAL
State	ARIZONA

Preliminary Dynamic Spinner Summary

Southwest Exploration Services, LLC
borehole geophysics & video services

COMPANY	FLORENCE COPPER		
WELL ID	R-03		
FIELD	FLORENCE COPPER		
COUNTY	PINAL	STATE	ARIZONA

TYPE OF LOGS: DYNAMIC SPINNER
MORE:

LOCATION			OTHER SERVICES
			NONE
SEC	TWP	RGE	

PERMANENT DATUM		ELEVATION	K.B.
LOG MEAS. FROM	GROUND LEVEL	ABOVE PERM. DATUM	D.F.
DRILLING MEAS. FROM	GROUND LEVEL		G.L.

DATE	5-22-18	TYPE FLUID IN HOLE	FORMATION WATER
RUN No	1	MUD WEIGHT	N/A
TYPE LOG	DYNAMIC SPINNER	VISCOSITY	N/A
DEPTH-DRILLER	1200 FT.	LEVEL	N/A
DEPTH-LOGGER	1190 FT.	MAX. REC. TEMP.	N/A
BTM LOGGED INTERVAL	1180 FT.	IMAGE ORIENTED TO:	N/A
TOP LOGGED INTERVAL	480 FT.	SAMPLE INTERVAL	0.2 FT.
DRILLER / RIG#	HYDRO RESOURCES	LOGGING TRUCK	TRUCK #200
RECORDED BY / Logging Eng.	A. OLSON	TOOL STRING/SN	MSI SFM SPINNER SN 5726
WITNESSED BY	COLLIN - H&A	LOG TIME:ON SITE/OFF SITE	9:30 A.M.

RUN	BOREHOLE RECORD			CASING RECORD			
NO.	BIT	FROM	TO	SIZE	WGT.	FROM	TO
1	?	SURFACE	40 FT.	14 IN.	STEEL	SURFACE	500 FT.
2	20 IN.	40 FT	506 FT.	5 IN.	FG	SURFACE	500 FT.
3	12 1/4 IN.	506 FT.	TOTAL DEPTH	5 IN.	PVC	500 FT.	TOTAL DEPTH

COMMENTS:

Tool Summary:

Date	5-22-18	Date		Date	
Run No.	1	Run No.	2	Run No.	3
Tool Model	MSI SFM SPINNER	Tool Model		Tool Model	
Tool SN	5726	Tool SN		Tool SN	
From	480 FT.	From		From	
To	1180 FT.	To		To	
Recorded By	A. OLSON	Recorded By		Recorded By	
Truck No	200	Truck No		Truck No	
Operation Check	5-14-18	Operation Check		Operation Check	
Calibration Check	5-14-18	Calibration Check		Calibration Check	
Time Logged	11:00 A.M.	Time Logged		Time Logged	

Date		Date		Date	
Run No.	4	Run No.	5	Run No.	6
Tool Model		Tool Model		Tool Model	
Tool SN		Tool SN		Tool SN	
From		From		From	
To		To		To	
Recorded By		Recorded By		Recorded By	
Truck No		Truck No		Truck No	
Operation Check		Operation Check		Operation Check	
Calibration Check		Calibration Check		Calibration Check	
Time Logged		Time Logged		Time Logged	

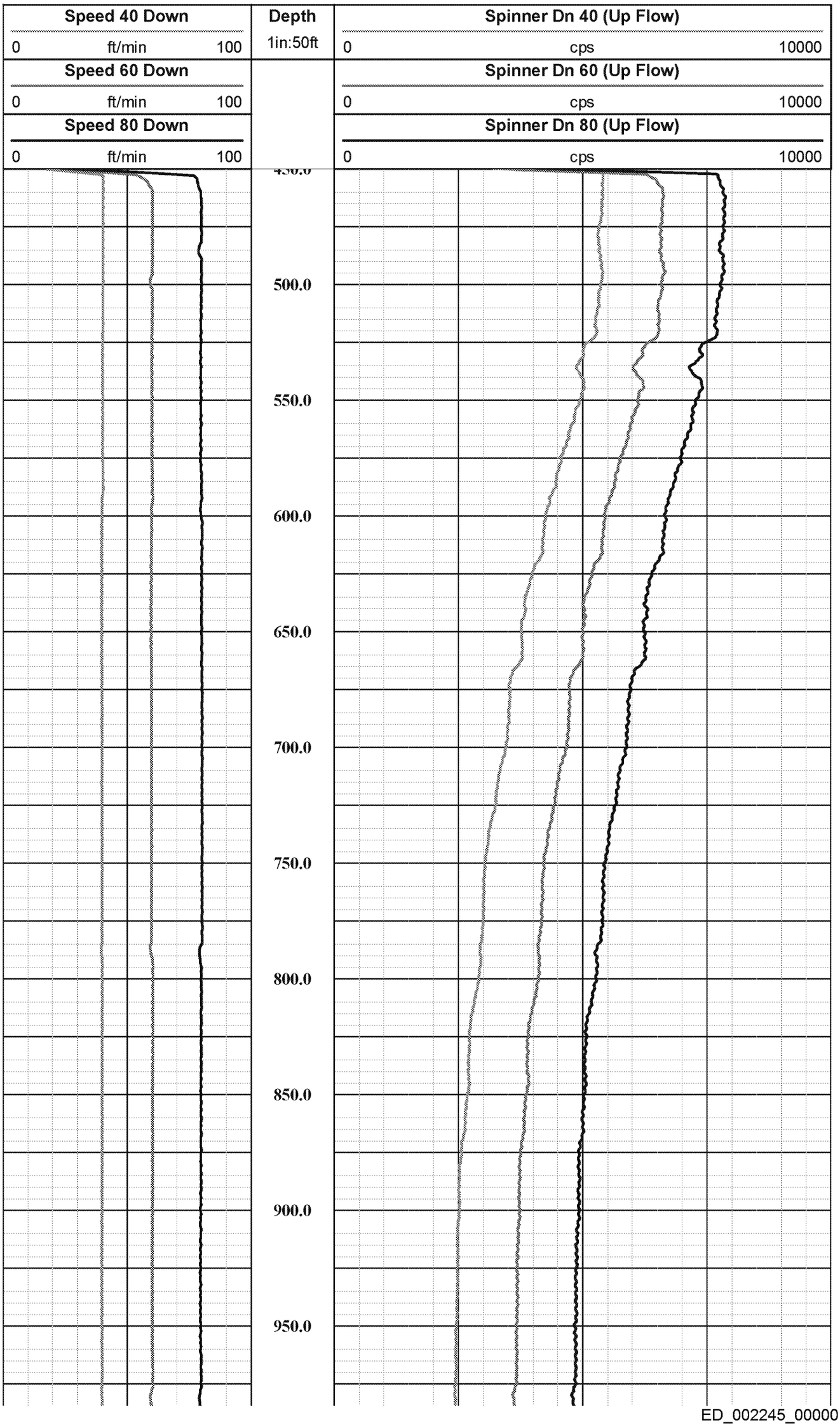
Additional Comments:

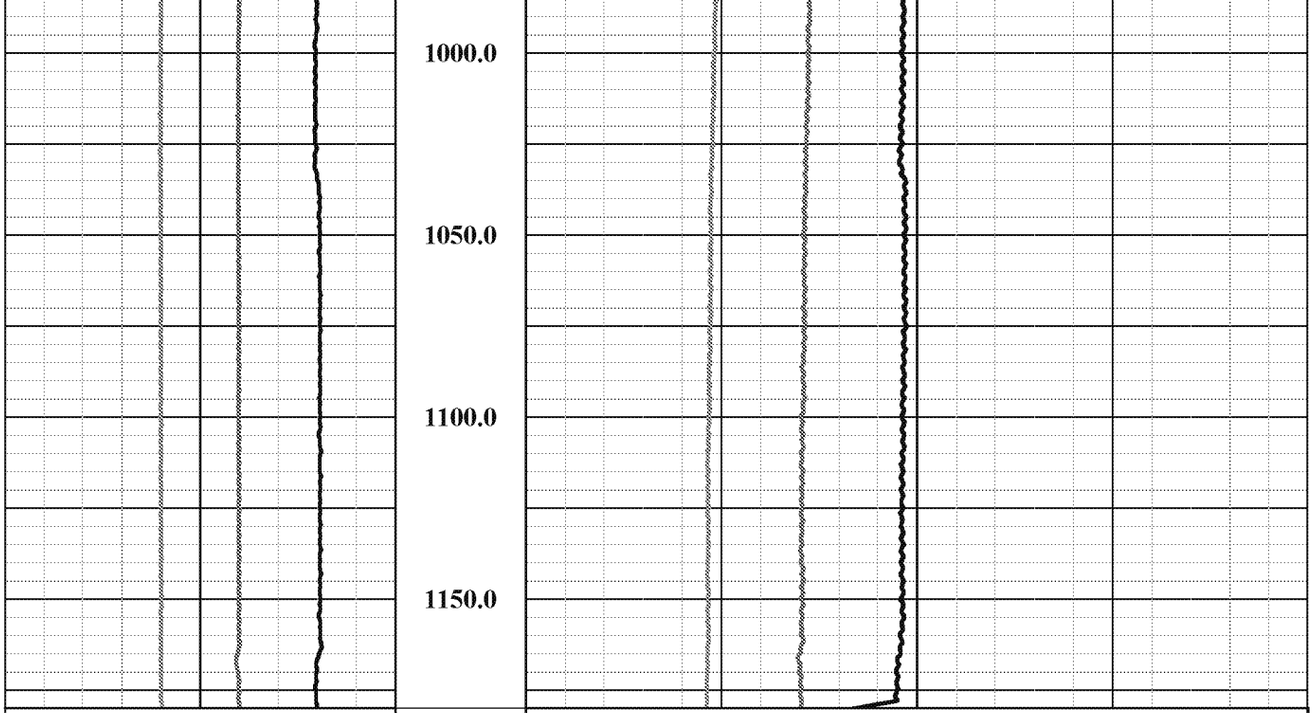
Caliper Arms Used: N/A **Calibration Points:** N/A

E-Log Calibration Range: N/A **Calibration Points:** N/A

Disclaimer:

All interpretations of log data are opinions based on inferences from electrical or other measurements. We do not guarantee the accuracy or correctness of any interpretations or recommendations and shall not be liable or responsible for any loss, costs, damages, or expenses incurred or sustained by anyone resulting from any interpretation made by any of our employees or agents. These interpretations are also subject to our general terms and conditions set out in our current Service Invoice.

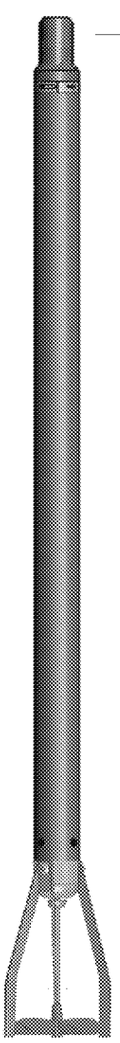

Speed 40 Down
0 ft/min 100
Speed 60 Down
0 ft/min 100
Speed 80 Down
0 ft/min 100
Depth
1in:50ft
Spinner Dn 40 (Up Flow)
0 cps 10000
Spinner Dn 60 (Up Flow)
0 cps 10000
Spinner Dn 80 (Up Flow)
0 cps 10000
500.0
550.0
600.0
650.0
700.0
750.0
800.0
850.0
900.0
950.0



0 ft/min 100 **Speed 80 Down**		0 cps 10000 **Spinner Dn 80 (Up Flow)**
0 ft/min 100 **Speed 60 Down**		0 cps 10000 **Spinner Dn 60 (Up Flow)**
0 ft/min 100 **Speed 40 Down**	1in:50ft **Depth**	0 cps 10000 **Spinner Dn 40 (Up Flow)**

MSI QL-40 Spinner Flowmeter (SFM) SN 5726

Probe Top = Depth Ref.



Single Conductor MSI Probe Top

Probe Length = 0.90 m or 2.95 ft
Probe Weight = 3.25 kg or 7.2 lbs

Operating Temperature: 80 Deg C (176 Deg F)

Presure Rating: 200 bar (2900 psi)

Two impeller cage sizes: 3" and 4"

Tool is run centeralized. Depending on well diamter, a weight bar may be added to the assembly.

Can be used in static wells or under pumping conditions.

Measures both upflow and downflow.

Minimum Flow Rate: 3-5 gpm
Maximum Flow Rate: 5000 gpm

1.57" or 40 mm Diameter (Cage dependent)

Southwest Exploration Services, LLC

borehole geophysics & video services

Company	FLORENCE COPPER
Well	R-03
Field	FLORENCE COPPER
County	PINAL
State	ARIZONA

Preliminary Dynamic Spinner Summary

Southwest Exploration Services, LLC
borehole geophysics & video services

COMPANY	FLORENCE COPPER		
WELL ID	R-05		
FIELD	FLORENCE COPPER		
COUNTY	PINAL	STATE	ARIZONA

TYPE OF LOGS: DYNAMIC SPINNER
MORE:

LOCATION — OTHER SERVICES: NONE

SEC TWP RGE

PERMANENT DATUM		ELEVATION	K.B.
LOG MEAS. FROM	GROUND LEVEL	ABOVE PERM. DATUM	D.F.
DRILLING MEAS. FROM	GROUND LEVEL		G.L.

DATE	5-20-18	TYPE FLUID IN HOLE	FORMATION WATER
RUN No	1	MUD WEIGHT	N/A
TYPE LOG	DYNAMIC SPINNER	VISCOSITY	N/A
DEPTH-DRILLER	1200 FT.	LEVEL	N/A
DEPTH-LOGGER	1190 FT.	MAX. REC. TEMP.	N/A
BTM LOGGED INTERVAL	1180 FT.	IMAGE ORIENTED TO:	N/A
TOP LOGGED INTERVAL	480 FT.	SAMPLE INTERVAL	0.2 FT.
DRILLER / RIG#	HYDRO RESOURCES	LOGGING TRUCK	TRUCK #200
RECORDED BY / Logging Eng.	A. OLSON	TOOL STRING/SN	MSI SFM SPINNER SN 5726
WITNESSED BY	COLLIN - H&A	LOG TIME:ON SITE/OFF SITE	9:30 A.M.

RUN	BOREHOLE RECORD			CASING RECORD			
NO.	BIT	FROM	TO	SIZE	WGT.	FROM	TO
1	?	SURFACE	40 FT.	14 IN.	STEEL	SURFACE	500 FT.
2	20 IN.	40 FT	506 FT.	5 IN.	FG	SURFACE	500 FT.
3	12 1/4 IN.	506 FT.	TOTAL DEPTH	5 IN.	PVC	500 FT.	TOTAL DEPTH

COMMENTS:

Tool Summary:

Date	5-20-18	Date		Date	
Run No.	1	Run No.	2	Run No.	3
Tool Model	MSI SFM SPINNER	Tool Model		Tool Model	
Tool SN	5726	Tool SN		Tool SN	
From	480 FT.	From		From	
To	1180 FT.	To		To	
Recorded By	A. OLSON	Recorded By		Recorded By	
Truck No	200	Truck No		Truck No	
Operation Check	5-14-18	Operation Check		Operation Check	
Calibration Check	5-14-18	Calibration Check		Calibration Check	
Time Logged	11:00 A.M.	Time Logged		Time Logged	

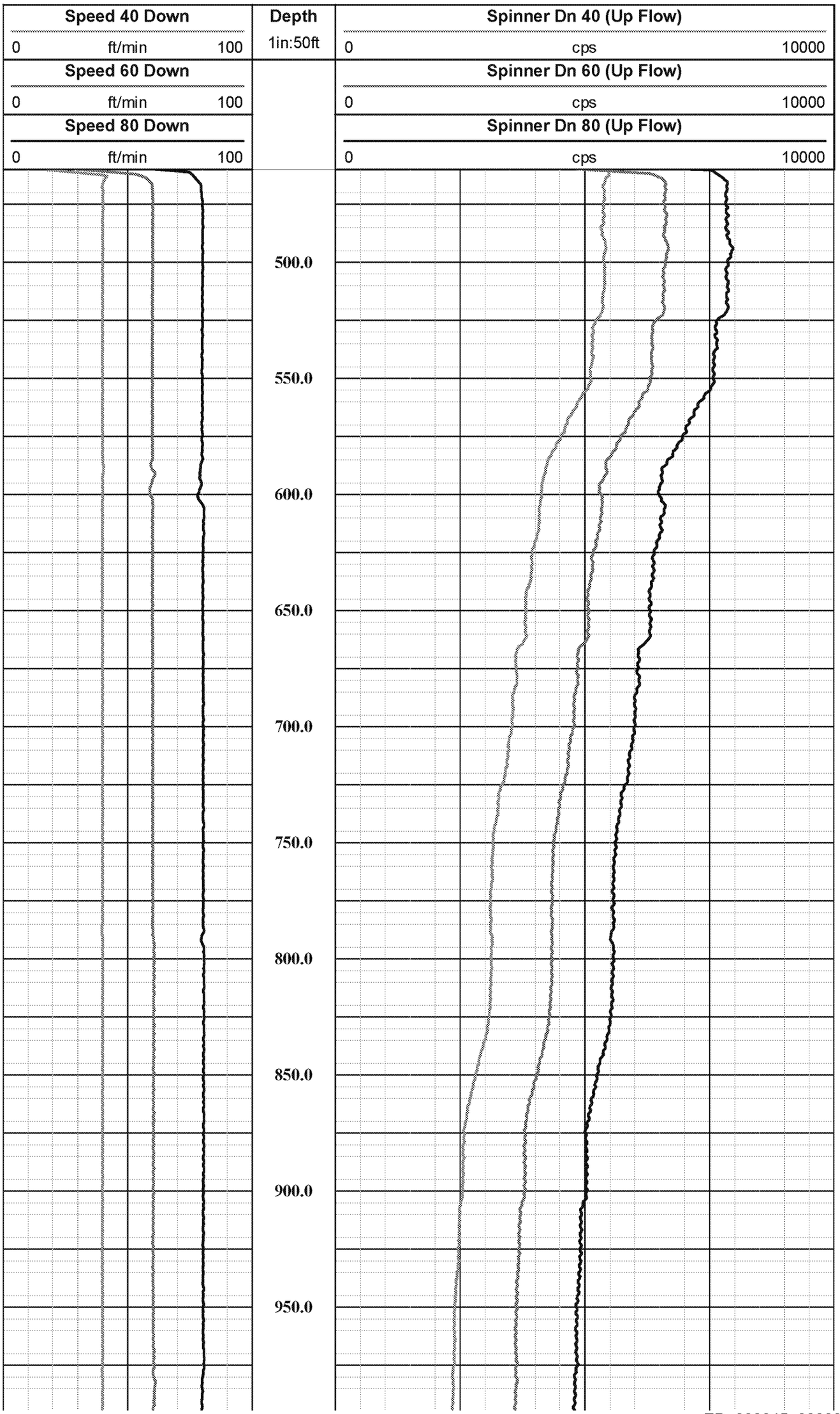
Date		Date		Date	
Run No.	4	Run No.	5	Run No.	6
Tool Model		Tool Model		Tool Model	
Tool SN		Tool SN		Tool SN	
From		From		From	
To		To		To	
Recorded By		Recorded By		Recorded By	
Truck No		Truck No		Truck No	
Operation Check		Operation Check		Operation Check	
Calibration Check		Calibration Check		Calibration Check	
Time Logged		Time Logged		Time Logged	

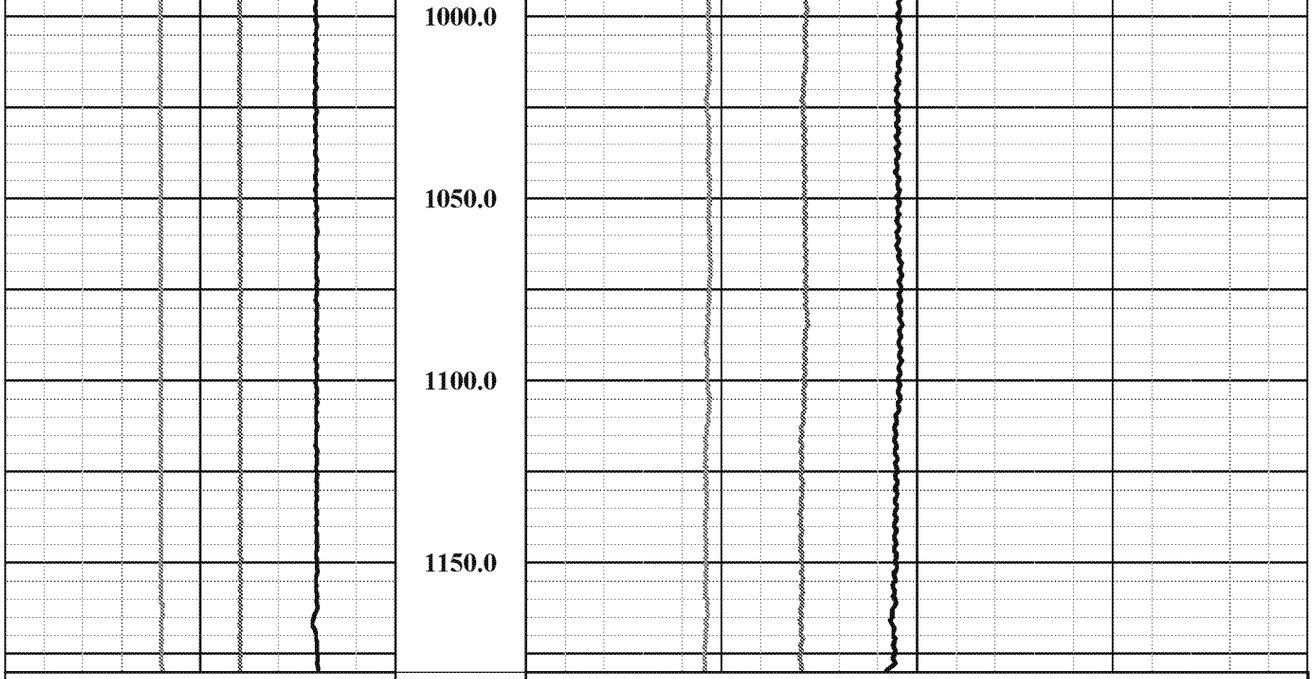
Additional Comments:

Caliper Arms Used: N/A **Calibration Points:** N/A

E-Log Calibration Range: N/A **Calibration Points:** N/A

Disclaimer:

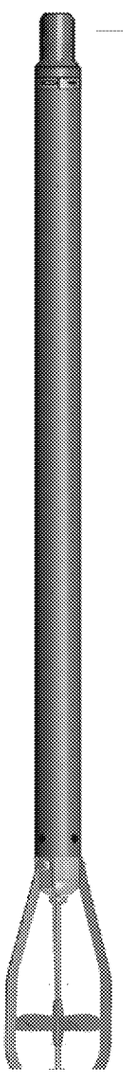

Speed 40 Down
0 ft/min 100
Speed 60 Down
0 ft/min 100
Speed 80 Down
0 ft/min 100
Depth
1in:50ft
Spinner Dn 40 (Up Flow)
0 cps 10000
Spinner Dn 60 (Up Flow)
0 cps 10000
Spinner Dn 80 (Up Flow)
0 cps 10000
500.0
550.0
600.0
650.0
700.0
750.0
800.0
850.0
900.0
950.0



0 ft/min 100 **Speed 80 Down**		0 cps 10000 **Spinner Dn 80 (Up Flow)**
0 ft/min 100 **Speed 60 Down**		0 cps 10000 **Spinner Dn 60 (Up Flow)**
0 ft/min 100 **Speed 40 Down**	1in:50ft **Depth**	0 cps 10000 **Spinner Dn 40 (Up Flow)**

MSI QL-40 Spinner Flowmeter (SFM) SN 5726

Probe Top = Depth Ref.



Single Conductor MSI Probe Top

Probe Length = 0.90 m or 2.95 ft
Probe Weight = 3.25 kg or 7.2 lbs

Operating Temperature: 80 Deg C (176 Deg F)

Presure Rating: 200 bar (2900 psi)

Two impeller cage sizes: 3" and 4"

Tool is run centeralized. Depending on well diamter, a weight bar may be added to the assembly.

Can be used in static wells or under pumping conditions.

Measures both upflow and downflow.

Minimum Flow Rate: 3-5 gpm
Maximum Flow Rate: 5000 gpm

1.57" or 40 mm Diameter (Cage dependent)

Southwest Exploration Services, LLC
borehole geophysics & video services

Company	FLORENCE COPPER
Well	R-05
Field	FLORENCE COPPER
County	PINAL
State	ARIZONA

Preliminary Dynamic Spinner Summary

Southwest Exploration Services, LLC
borehole geophysics & video services

COMPANY	FLORENCE COPPER
WELL ID	R-07
FIELD	FLORENCE COPPER
COUNTY	PINAL
STATE	ARIZONA

TYPE OF LOGS: DYNAMIC SPINNER
MORE:

LOCATION

OTHER SERVICES
NONE

SEC TWP RGE

PERMANENT DATUM		ELEVATION	K.B.
LOG MEAS. FROM	GROUND LEVEL	ABOVE PERM. DATUM	D.F.
DRILLING MEAS. FROM	GROUND LEVEL		G.L.

DATE	5-18-18	TYPE FLUID IN HOLE	MUD
RUN No	1	MUD WEIGHT	N/A
TYPE LOG	DYNAMIC SPINNER	VISCOSITY	N/A
DEPTH-DRILLER	1200 FT.	LEVEL	N/A
DEPTH-LOGGER	1193 FT.	MAX. REC. TEMP.	N/A
BTM LOGGED INTERVAL	1180 FT.	IMAGE ORIENTED TO:	N/A
TOP LOGGED INTERVAL	480 FT.	SAMPLE INTERVAL	0.2 FT.
DRILLER / RIG#	HYDRO RESOURCES	LOGGING TRUCK	TRUCK #200
RECORDED BY / Logging Eng.	A. OLSON	TOOL STRING/SN	MSI SFM SPINNER SN 5726
WITNESSED BY	COLLIN - H&A	LOG TIME:ON SITE/OFF SITE	7:00 A.M.

RUN	BOREHOLE RECORD			CASING RECORD			
NO.	BIT	FROM	TO	SIZE	WGT.	FROM	TO
1	?	SURFACE	40 FT.	14 IN.	STEEL	SURFACE	500 FT.
2	20 IN.	40 FT	506 FT.	5 IN.	FG	SURFACE	500 FT.
3	12 1/4 IN.	506 FT.	TOTAL DEPTH	5 IN.	PVC	500 FT.	TOTAL DEPTH

COMMENTS:

Tool Summary:

Date	5-18-18	Date		Date	
Run No.	1	Run No.	2	Run No.	3
Tool Model	MSI SFM SPINNER	Tool Model		Tool Model	
Tool SN	5726	Tool SN		Tool SN	
From	480 FT.	From		From	
To	1180 FT.	To		To	
Recorded By	A. OLSON	Recorded By		Recorded By	
Truck No	200	Truck No		Truck No	
Operation Check	5-14-18	Operation Check		Operation Check	
Calibration Check	5-14-18	Calibration Check		Calibration Check	
Time Logged	10:30 A.M.	Time Logged		Time Logged	

Date		Date		Date	
Run No.	4	Run No.	5	Run No.	6
Tool Model		Tool Model		Tool Model	
Tool SN		Tool SN		Tool SN	
From		From		From	
To		To		To	
Recorded By		Recorded By		Recorded By	
Truck No		Truck No		Truck No	
Operation Check		Operation Check		Operation Check	
Calibration Check		Calibration Check		Calibration Check	
Time Logged		Time Logged		Time Logged	

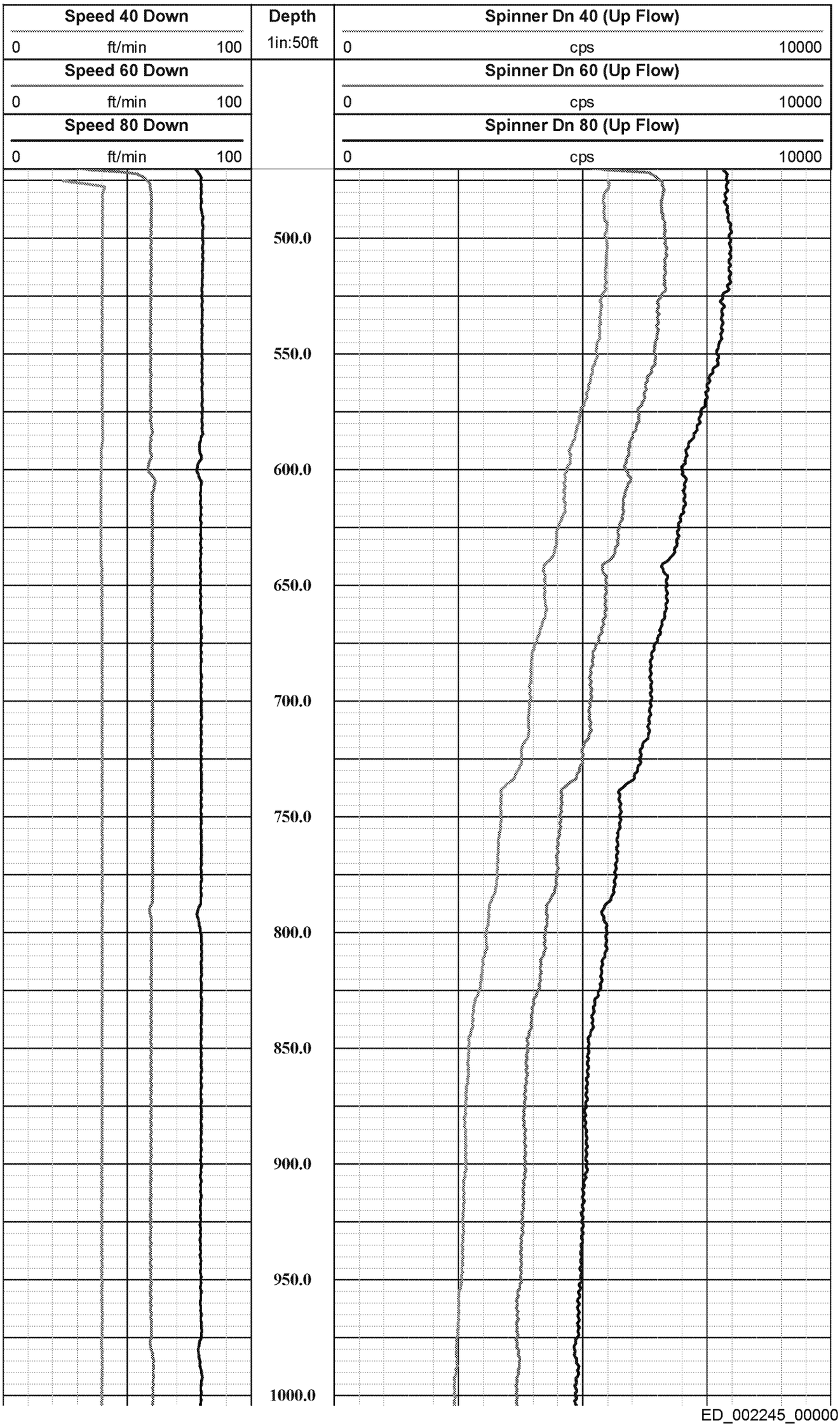
Additional Comments:

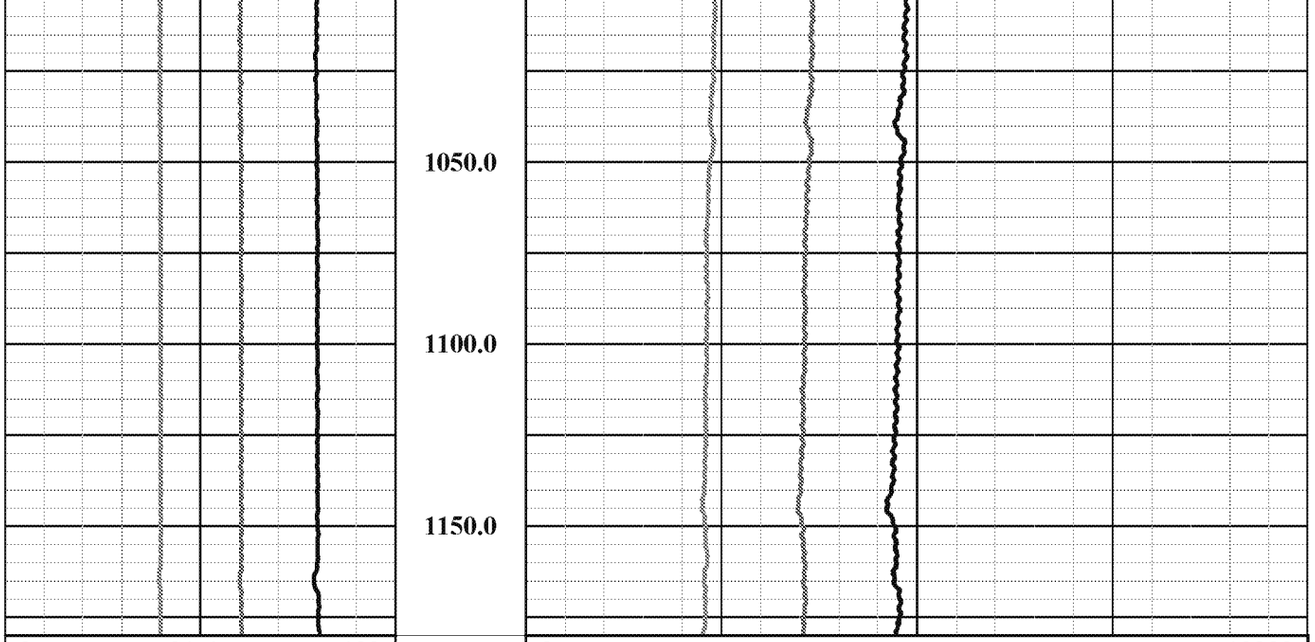
Caliper Arms Used: N/A **Calibration Points:** N/A

E-Log Calibration Range: N/A **Calibration Points:** N/A

Disclaimer:

All interpretations of log data are opinions based on inferences from electrical or other measurements. We do not guarantee the accuracy or correctness of any interpretations or recommendations and shall not be liable or responsible for any loss, costs, damages, or expenses incurred or sustained by anyone resulting from any interpretation made by any of our employees or agents. These interpretations are also subject to our general terms and conditions set out in our current Service Invoice.

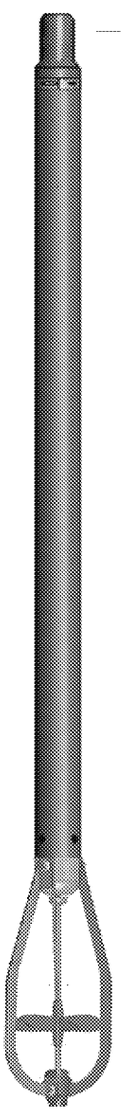

Speed 40 Down
0 ft/min 100
Speed 60 Down
0 ft/min 100
Speed 80 Down
0 ft/min 100
Depth
1in:50ft
Spinner Dn 40 (Up Flow)
0 cps 10000
Spinner Dn 60 (Up Flow)
0 cps 10000
Spinner Dn 80 (Up Flow)
0 cps 10000
500.0
550.0
600.0
650.0
700.0
750.0
800.0
850.0
900.0
950.0
1000.0



0 ft/min 100		0 cps 10000
Speed 80 Down		**Spinner Dn 80 (Up Flow)**
0 ft/min 100		0 cps 10000
Speed 60 Down		**Spinner Dn 60 (Up Flow)**
0 ft/min 100	1in:50ft	0 cps 10000
Speed 40 Down	**Depth**	**Spinner Dn 40 (Up Flow)**

MSI QL-40 Spinner Flowmeter (SFM) SN 5726

Probe Top = Depth Ref.



Probe Length = 0.90 m or 2.95 ft
Probe Weight = 3.25 kg or 7.2 lbs

Operating Temperature: 80 Deg C (176 Deg F)

Presure Rating: 200 bar (2900 psi)

Two impeller cage sizes: 3" and 4"

Tool is run centeralized. Depending on well diamter, a weight bar may be added to the assembly.

Can be used in static wells or under pumping conditions.

Measures both upflow and downflow.

Minimum Flow Rate: 3-5 gpm
Maximum Flow Rate: 5000 gpm

1.57" or 40 mm Diameter (Cage dependent)

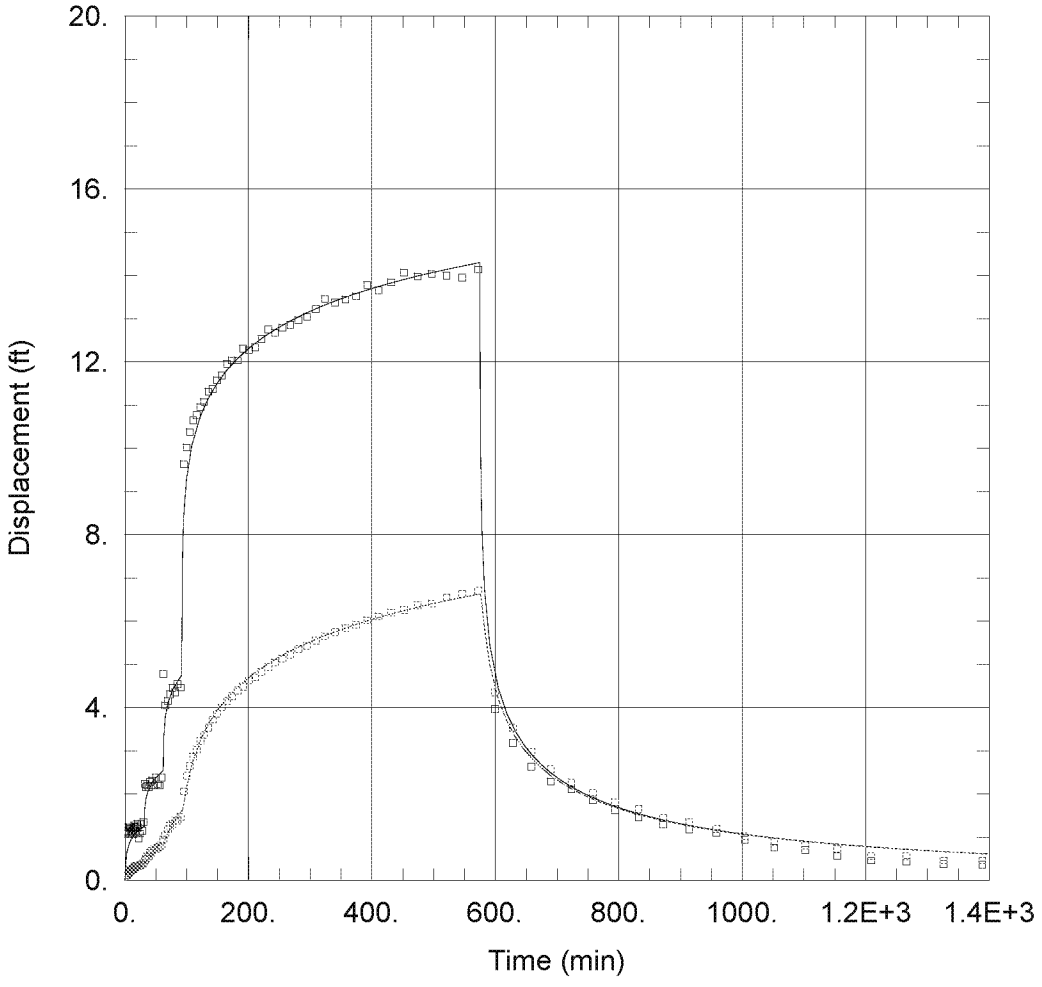
Southwest Exploration Services, LLC
borehole geophysics & video services

Company	FLORENCE COPPER
Well	R-07
Field	FLORENCE COPPER
County	PINAL
State	ARIZONA

Preliminary Dynamic Spinner Summary

APPENDIX C

AQTESOLV Results



WELL TEST ANALYSIS

Data Set: C:\...\R-01_O-01_draft.aqt
Date: 07/23/18 Time: 04:15:36

AQUIFER DATA

Saturated Thickness: 841. ft
Aquitard Thickness (b'): 1. ft
Anisotropy Ratio (Kz/Kr): 1.
Aquitard Thickness (b"): 1. ft

WELL DATA

Pumping Wells

Well Name	X (ft)	Y (ft)
R-01	847692.93	746271.15

Observation Wells

Well Name	X (ft)	Y (ft)
R-01	847692.93	746271.15
O-01	847692.93	746200.45

SOLUTION

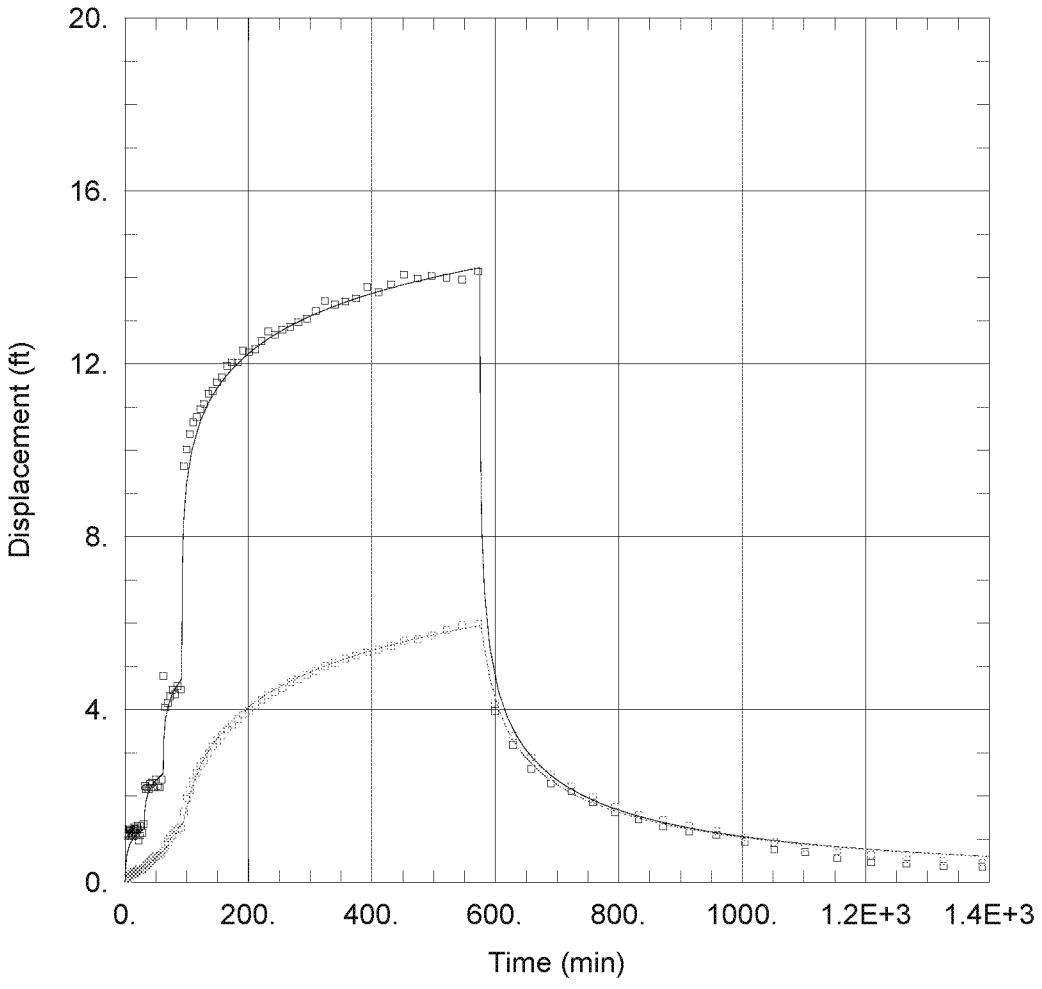
Aquifer Model: Leaky
Solution Method: Hantush-Jacob

T = 406.5 ft^2/day
1/B = 0.0007515 ft^{-1}
C = 0.1318 min^2/ft^5

S = 0.0009847
Sw = -3.648
P = 1.747

Step Test Model: Jacob-Rorabaugh
Time (t) = 1. min Rate (Q) in cu. ft/min

$s(t) = 0.2973Q + 0.1318Q^{1.747}$
W.E. = 311.2% (Q from last step)



WELL TEST ANALYSIS

Data Set: C:\...\R-01_O-07_draft.aqt
Date: 07/23/18 Time: 04:20:21

AQUIFER DATA

Saturated Thickness: 841. ft
Aquitard Thickness (b'): 1. ft
Anisotropy Ratio (Kz/Kr): 1.
Aquitard Thickness (b"): 1. ft

WELL DATA

Pumping Wells

Well Name	X (ft)	Y (ft)
R-01	847692.93	746271.15

Observation Wells

Well Name	X (ft)	Y (ft)
R-01	847692.93	746271.15
O-07	847623.88	746270.61

SOLUTION

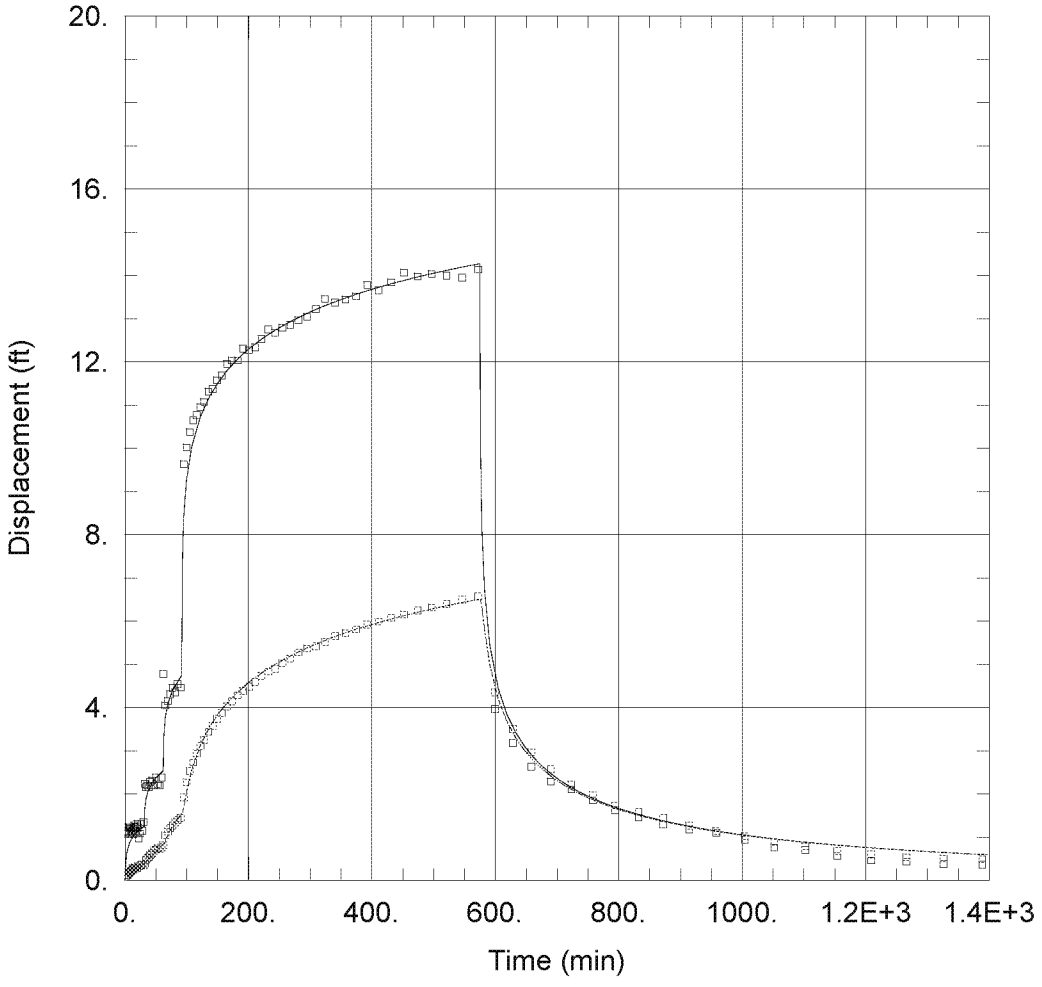
Aquifer Model: Leaky
Solution Method: Hantush-Jacob

T = 410.9 ft^2/day
1/B = 0.0009071 ft^{-1}
C = 0.1318 min^2/ft^5

S = 0.001363
Sw = -3.498
P = 1.747

Step Test Model: Jacob-Rorabaugh
Time (t) = 1. min Rate (Q) in cu. ft/min

$s(t) = 0.2907Q + 0.1318Q^{1.747}$
W.E. = 298.9% (Q from last step)



WELL TEST ANALYSIS

Data Set: C:\...\R-01_I-01_draft.aqt
Date: 07/22/18 Time: 00:31:26

AQUIFER DATA

Saturated Thickness: 841. ft
Anisotropy Ratio (Kz/Kr): 1.
Aquitard Thickness (b'): 1. ft
Aquitard Thickness (b"): 1. ft

WELL DATA

Pumping Wells

Well Name	X (ft)	Y (ft)
R-01	847692.93	746271.15

Observation Wells

Well Name	X (ft)	Y (ft)
R-01	847692.93	746271.15
I-01	847692.93	746200.45

SOLUTION

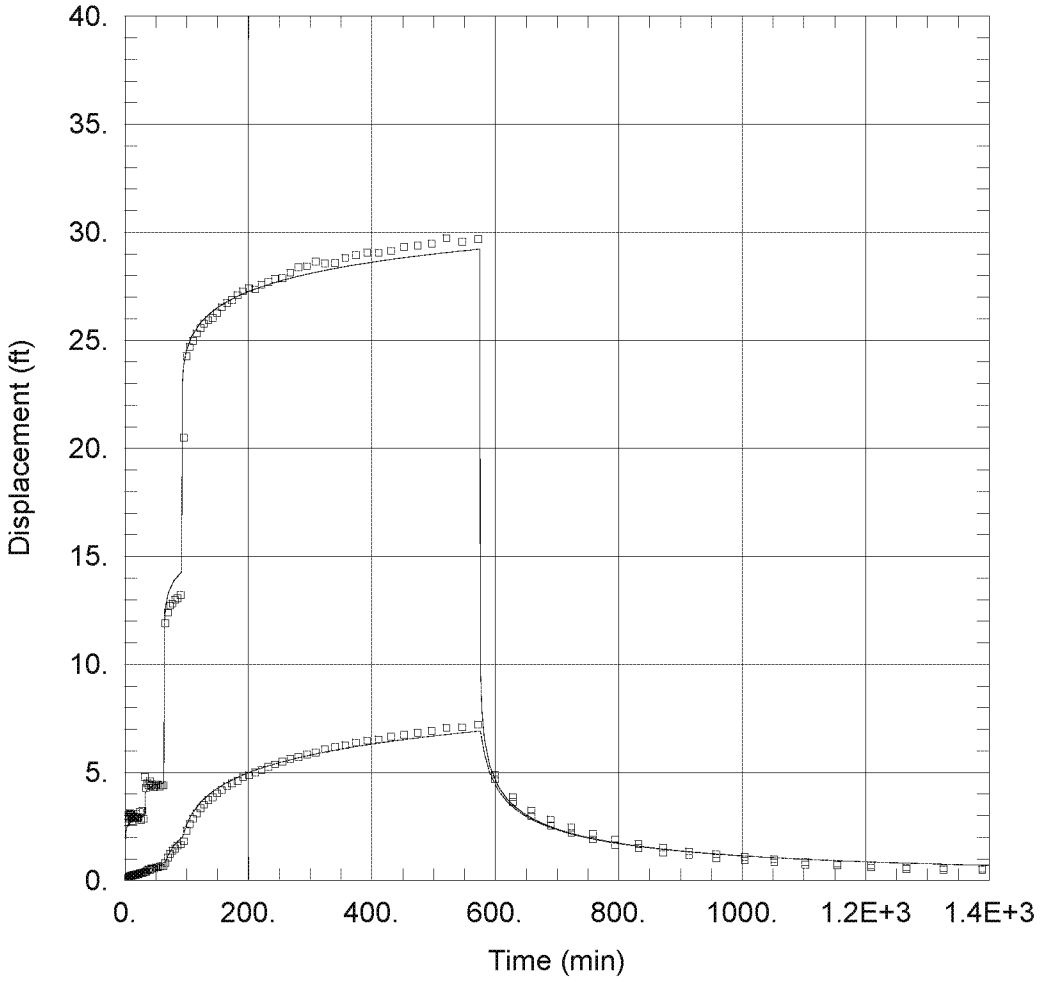
Aquifer Model: Leaky
Solution Method: Hantush-Jacob

T = 407.1 ft^2/day
1/B = 0.0008649 ft^{-1}
C = 0.1318 min^2/ft^5

S = 0.001101
Sw = -3.598
P = 1.747

Step Test Model: Jacob-Rorabaugh
Time (t) = 1. min Rate (Q) in cu. ft/min

$s(t) = 0.2939Q + 0.1318Q^{1.747}$
W.E. = 308.% (Q from last step)



WELL TEST ANALYSIS

Data Set: C:\Users\cgardner\Documents\Florence Copper Project\AQTESOLV\R-03\R-03_O-02_draft.aqt
Date: 06/06/18 Time: 17:22:44

AQUIFER DATA

Saturated Thickness: 824. ft
Aquitard Thickness (b'): 1. ft
Anisotropy Ratio (Kz/Kr): 1.
Aquitard Thickness (b''): 1. ft

WELL DATA

Pumping Wells

Well Name	X (ft)	Y (ft)
R-03	847834.33	746129.75

Observation Wells

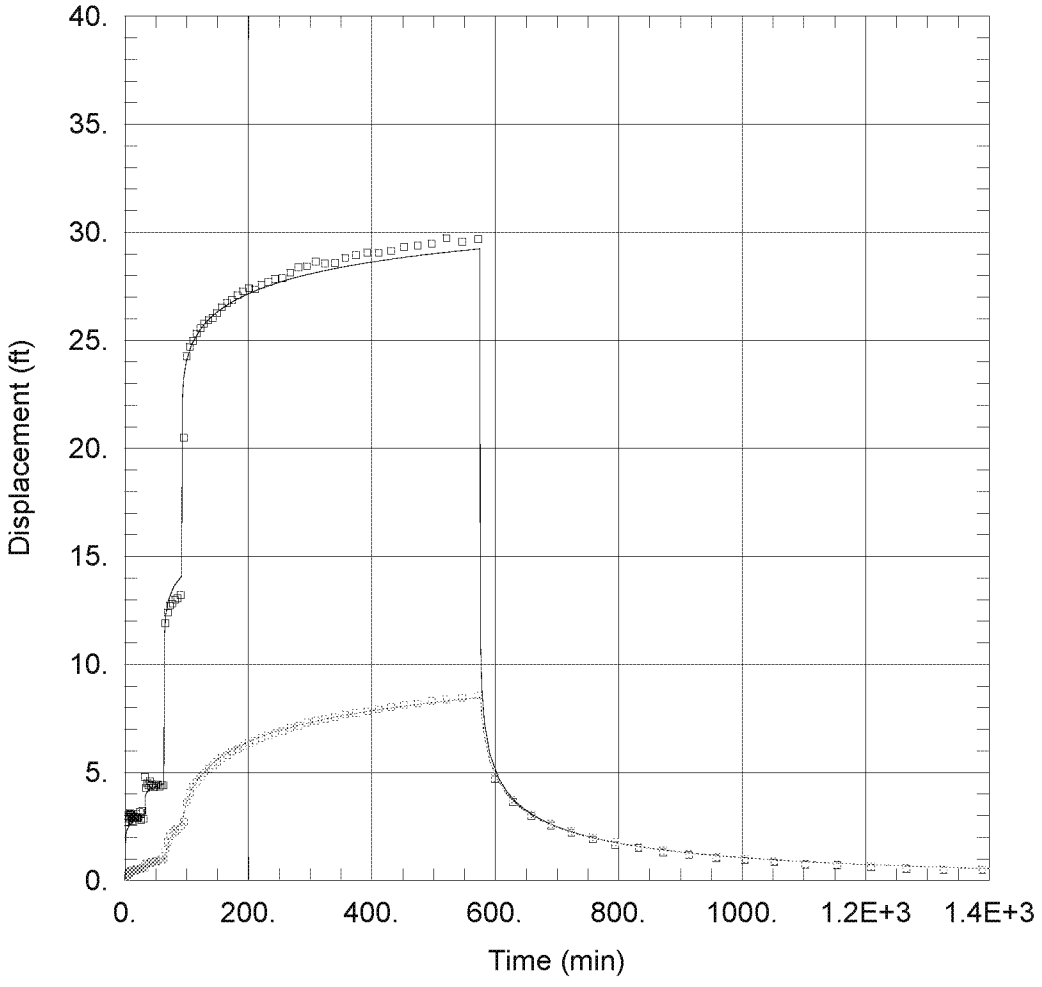
Well Name	X (ft)	Y (ft)
R-03	847834.33	746129.75
O-02	847834.34	746200.46

SOLUTION

Aquifer Model: Leaky
Solution Method: Hantush-Jacob

T = 433.9 ft^2/day
1/B = 2.381E-5 ft^{-1}
C = 0.3359 min^2/ft^5
S = 0.0007787
Sw = -0.1943
P = 1.634

Step Test Model: Jacob-Rorabaugh
Time (t) = 1. min Rate (Q) in cu. ft/min
$s(t) = 2.579Q + 0.3359Q^{1.634}$
W.E. = 75.33% (Q from last step)



WELL TEST ANALYSIS

Data Set: C:\Users\cgardner\Documents\Florence Copper Project\AQTESOLV\R-03\R-03_O-03_draft.aqt
Date: 06/06/18 Time: 17:22:47

AQUIFER DATA

Saturated Thickness: 824. ft
Aquitard Thickness (b'): 1. ft
Anisotropy Ratio (Kz/Kr): 1.
Aquitard Thickness (b"): 1. ft

WELL DATA

Pumping Wells

Well Name	X (ft)	Y (ft)
R-03	847834.33	746129.75

Observation Wells

Well Name	X (ft)	Y (ft)
R-03	847834.33	746129.75
O-03	847831.43	746053.02

SOLUTION

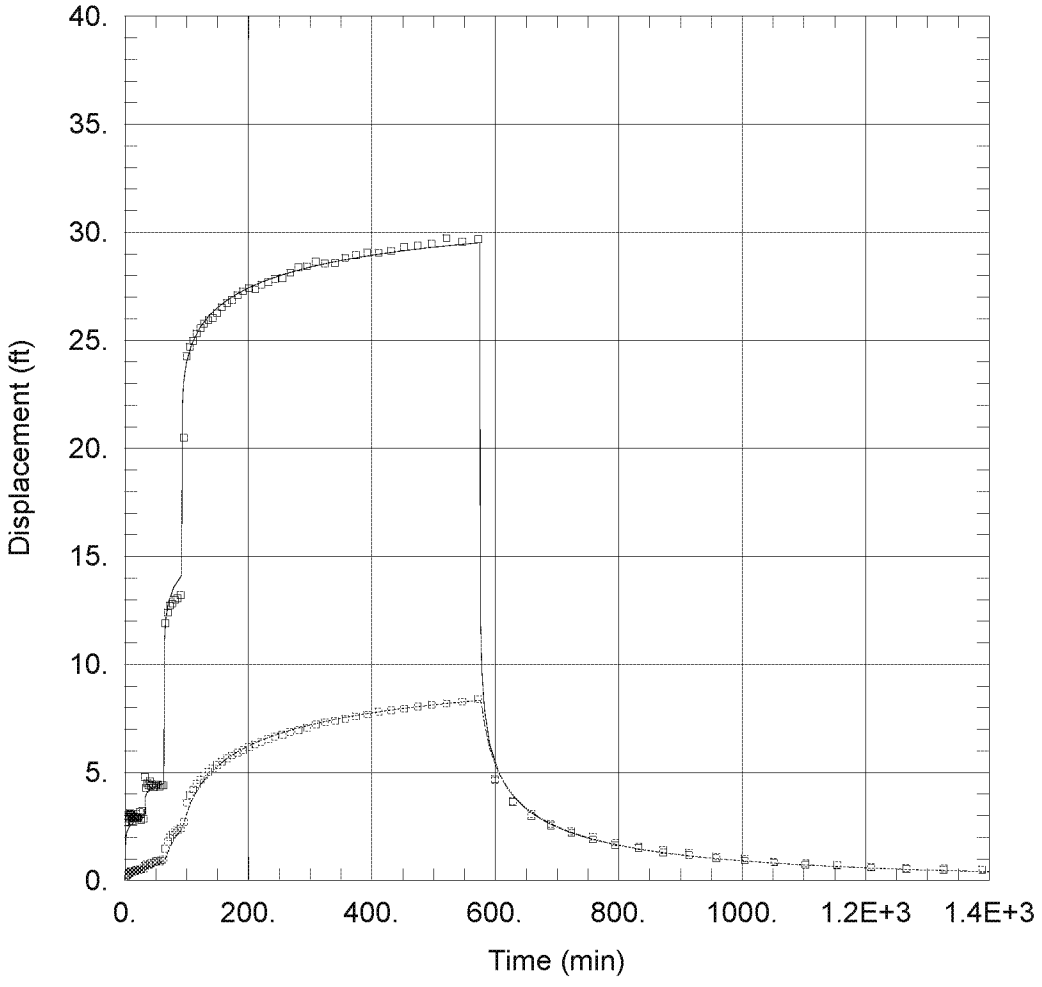
Aquifer Model: Leaky
Solution Method: Hantush-Jacob

T = 363.5 ft^2/day
1/B = 0.0007316 ft^{-1}
C = 0.3359 min^2/ft^5

S = 0.0003426
Sw = -1.494
P = 1.634

Step Test Model: Jacob-Rorabaugh
Time (t) = 1. min Rate (Q) in cu. ft/min

$s(t) = 2.327Q + 0.3359Q^{1.634}$
W.E. = 98.82% (Q from last step)



WELL TEST ANALYSIS

Data Set: C:\Users\cgardner\Documents\Florence Copper Project\AQTESOLV\R-03\R-03_I-02_draft.aqt
Date: 06/06/18 Time: 17:22:38

AQUIFER DATA

Saturated Thickness: 824. ft
Aquitard Thickness (b'): 1. ft
Anisotropy Ratio (Kz/Kr): 1.
Aquitard Thickness (b"): 1. ft

WELL DATA

Pumping Wells

Well Name	X (ft)	Y (ft)
R-03	847834.33	746129.75

Observation Wells

Well Name	X (ft)	Y (ft)
R-03	847834.33	746129.75
I-02	847763.63	746129.75

SOLUTION

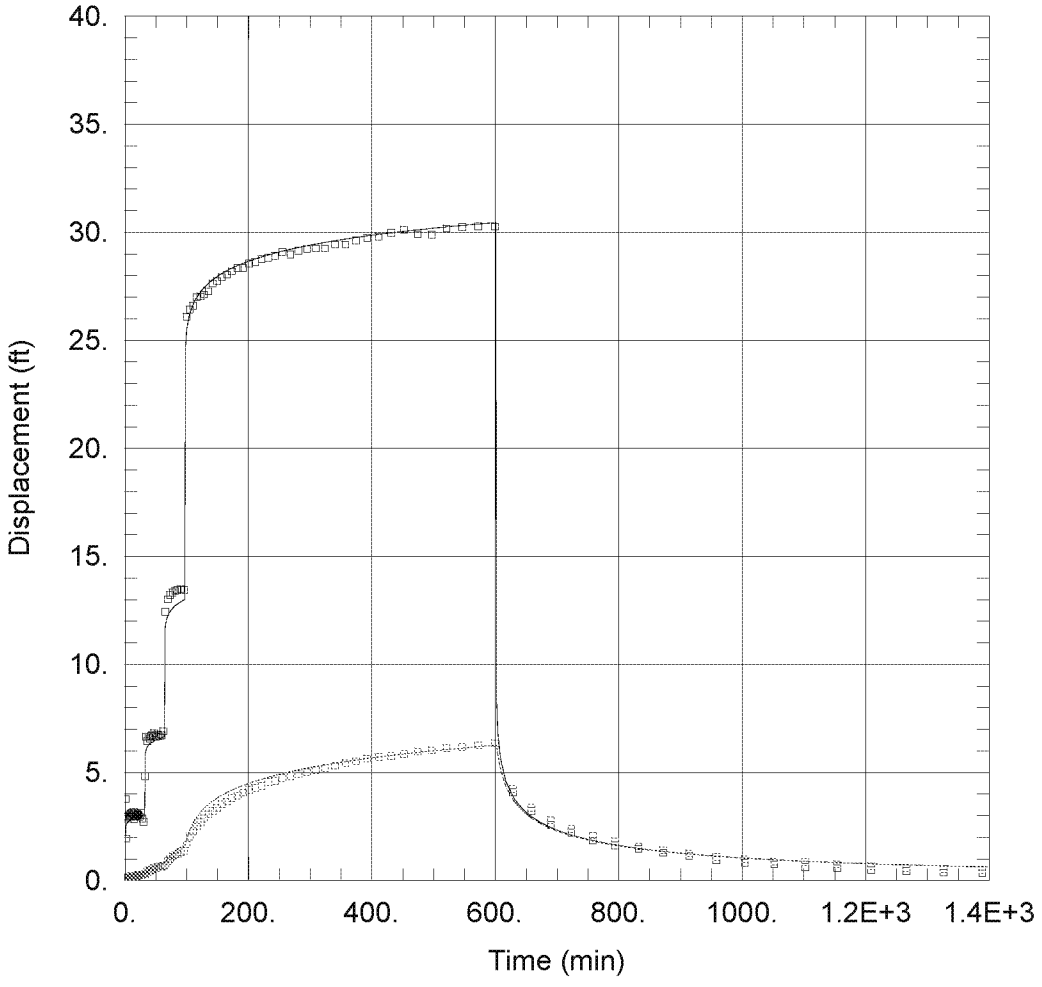
Aquifer Model: Leaky
Solution Method: Hantush-Jacob

T = 330.9 ft^2/day
1/B = 0.001638 ft^{-1}
C = 0.3359 min^2/ft^5

S = 0.0007787
Sw = -1.494
P = 1.634

Step Test Model: Jacob-Rorabaugh
Time (t) = 1. min Rate (Q) in cu. ft/min

$s(t) = 2.181Q + 0.3359Q^{1.634}$
W.E. = 101.7% (Q from last step)



WELL TEST ANALYSIS

Data Set: C:\Users\cgardner\Documents\Florence Copper Project\AQTESOLV\R-05\R-05_O-04_draft.aqt
Date: 06/06/18 Time: 12:50:09

AQUIFER DATA

Saturated Thickness: 824. ft
Aquitard Thickness (b'): 1. ft
Anisotropy Ratio (Kz/Kr): 1.
Aquitard Thickness (b"): 1. ft

WELL DATA

Pumping Wells

Well Name	X (ft)	Y (ft)
R-05	847692.91	745988.33

Observation Wells

Well Name	X (ft)	Y (ft)
R-05	847692.91	745988.33
O-04	847622.22	745987.44

SOLUTION

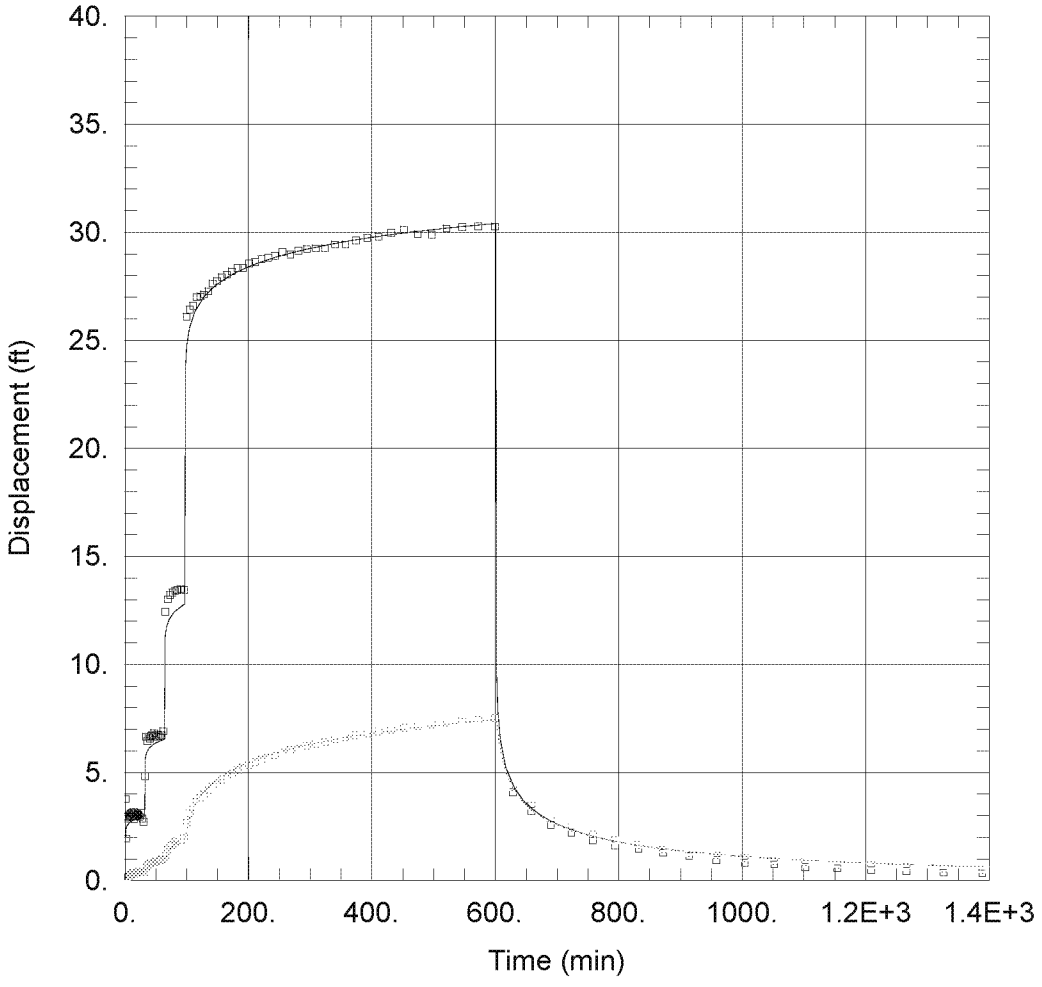
Aquifer Model: Leaky
Solution Method: Hantush-Jacob

T = 522.4 ft^2/day
1/B = 0.0002693 ft^{-1}
C = 0.1307 min^2/ft^5

S = 0.0007787
Sw = 2.338
P = 1.5

Step Test Model: Jacob-Rorabaugh
Time (t) = 1. min Rate (Q) in cu. ft/min

$s(t) = 3.538Q + 0.1307Q^{1.5}$
W.E. = 65.26% (Q from last step)



WELL TEST ANALYSIS

Data Set: C:\Users\cgardner\Documents\Florence Copper Project\AQTESOLV\R-05\R-05_I-03_draft.aqt
Date: 06/06/18 Time: 12:50:43

AQUIFER DATA

Saturated Thickness: 824. ft
Aquitard Thickness (b'): 1. ft
Anisotropy Ratio (Kz/Kr): 1.
Aquitard Thickness (b"): 1. ft

WELL DATA

Pumping Wells

Well Name	X (ft)	Y (ft)
R-05	847692.91	745988.33

Observation Wells

Well Name	X (ft)	Y (ft)
R-05	847692.91	745988.33
I-03	847692.92	746059.04

SOLUTION

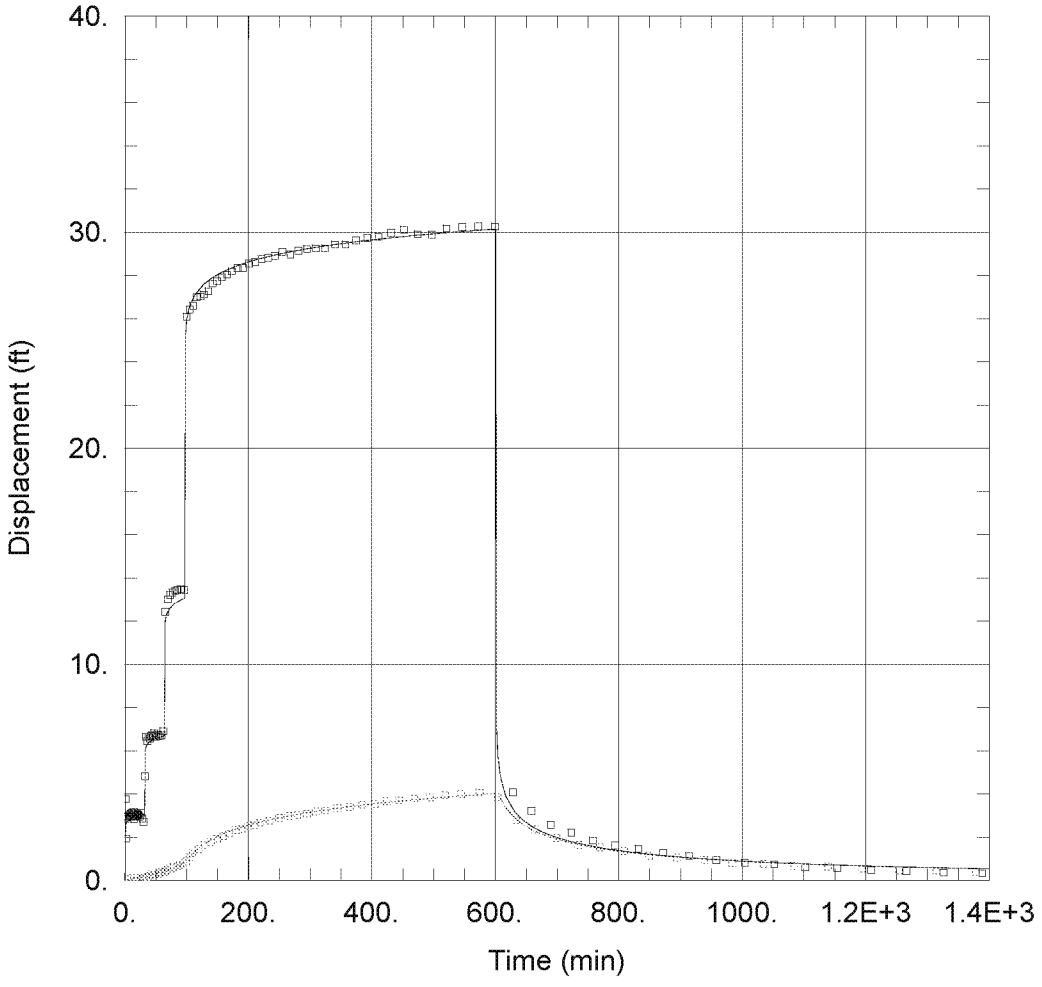
Aquifer Model: Leaky
Solution Method: Hantush-Jacob

T = 446.7 ft^2/day
1/B = 0.0005854 ft^{-1}
C = 0.1307 min^2/ft^5

S = 0.0005967
Sw = 0.9383
P = 1.5

Step Test Model: Jacob-Rorabaugh
Time (t) = 1. min Rate (Q) in cu. ft/min

$s(t) = 3.3Q + 0.1307Q^{1.5}$
W.E. = 78.04% (Q from last step)



WELL TEST ANALYSIS

Data Set: C:\Users\cgardner\Documents\Florence Copper Project\AQTESOLV\R-05\R-05_M60-O_draft.aqt
Date: 06/06/18 Time: 12:50:05

AQUIFER DATA

Saturated Thickness: 824. ft
Aquitard Thickness (b'): 1. ft
Anisotropy Ratio (Kz/Kr): 1.
Aquitard Thickness (b"): 1. ft

WELL DATA

Pumping Wells

Well Name	X (ft)	Y (ft)
R-05	847692.91	745988.33

Observation Wells

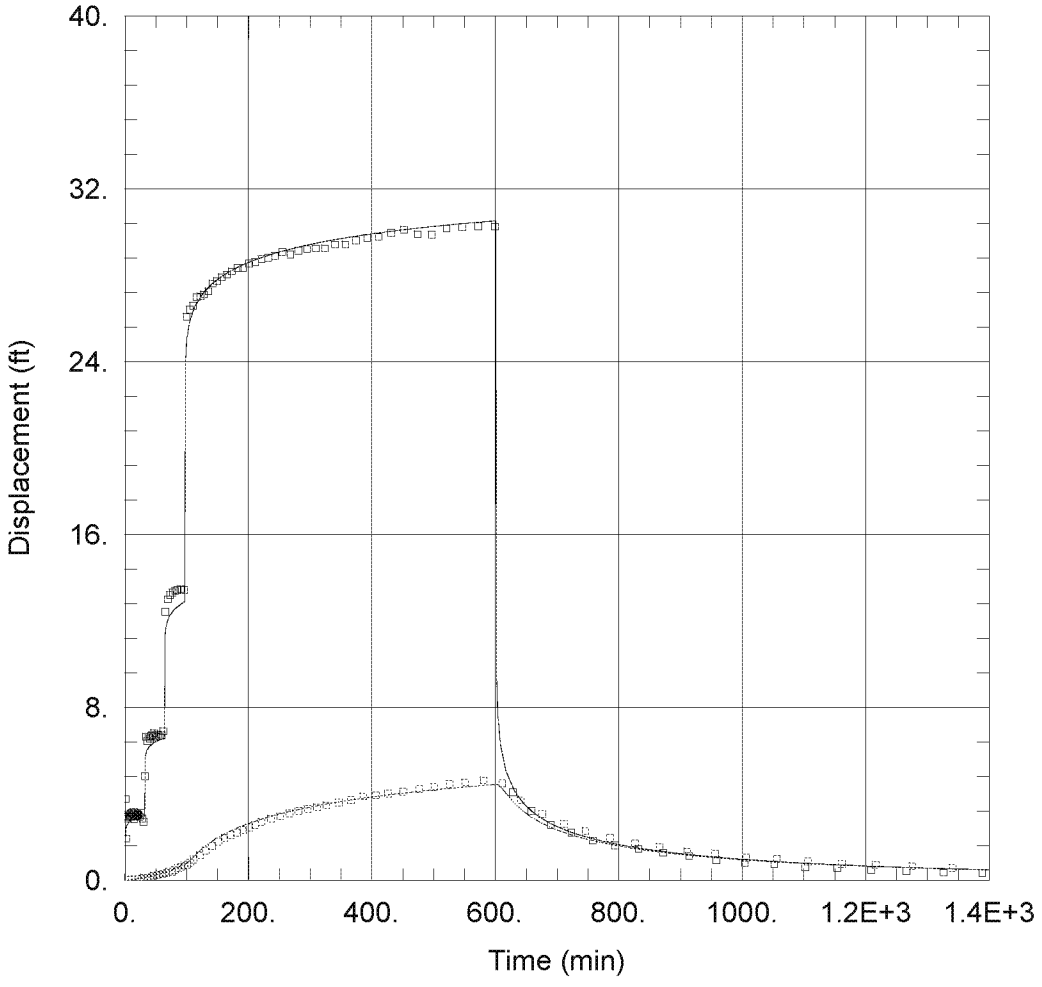
Well Name	X (ft)	Y (ft)
○ M60-O	847599	745904
□ R-05	847692.91	745988.33

SOLUTION

Aquifer Model: Leaky
Solution Method: Hantush-Jacob

T = 614.8 ft^2/day
1/B = 0.0001664 ft^{-1}
C = 0.1307 min^2/ft^5
S = 0.0007947
Sw = 3.838
P = 1.5

Step Test Model: Jacob-Rorabaugh
Time (t) = 1. min Rate (Q) in cu. ft/min
$s(t) = -0.3115Q + 0.1307Q^{1.5}$
W.E. = -1.188E+7% (Q from last step)



WELL TEST ANALYSIS

Data Set: C:\...\R-05_MW-01-O_draft.aqt
Date: 06/06/18 Time: 12:50:07

AQUIFER DATA

Saturated Thickness: 824. ft
Aquitard Thickness (b'): 1. ft
Anisotropy Ratio (Kz/Kr): 1.
Aquitard Thickness (b"): 1. ft

WELL DATA

Pumping Wells

Well Name	X (ft)	Y (ft)
R-05	847692.91	745988.33

Observation Wells

Well Name	X (ft)	Y (ft)
○ MW-01-O	847846.92	746356.72
□ R-05	847692.91	745988.33

SOLUTION

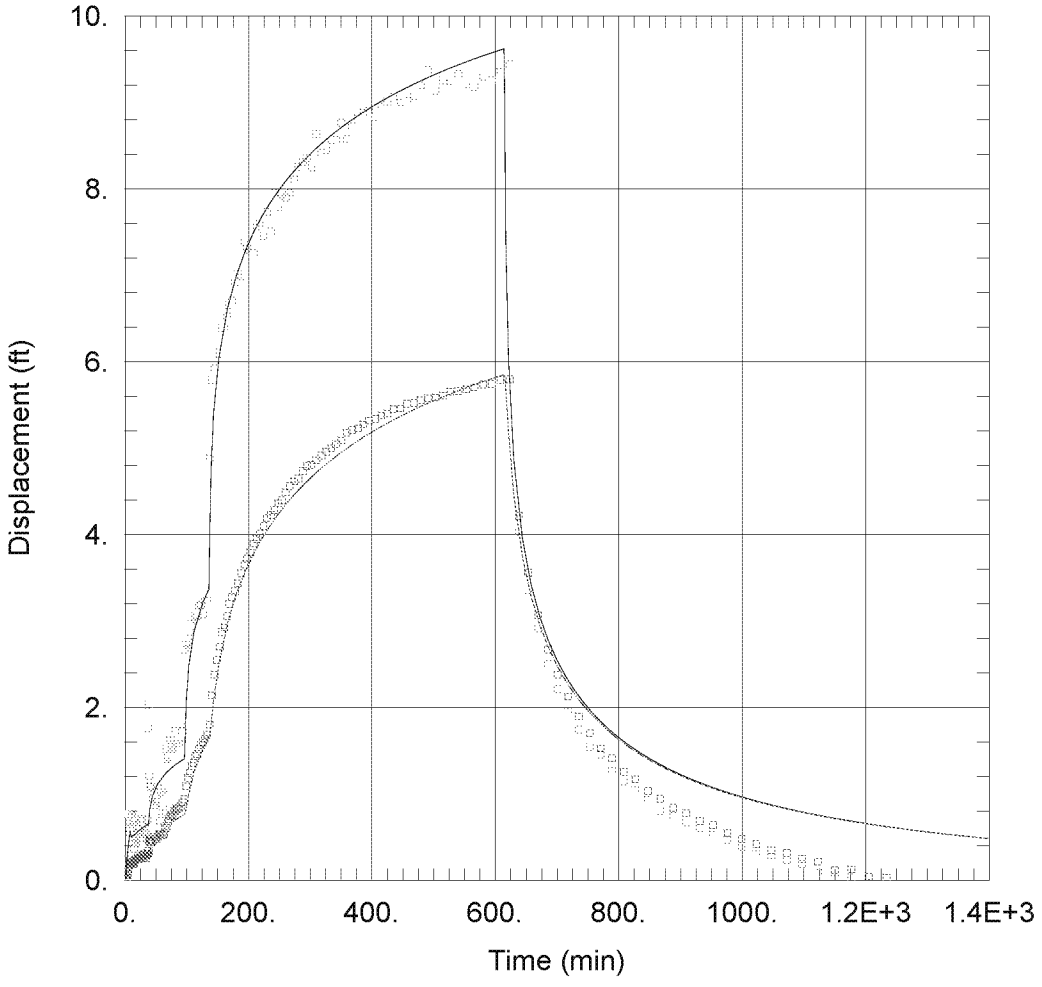
Aquifer Model: Leaky
Solution Method: Hantush-Jacob

T = 425.9 ft^2/day
1/B = 0.0003962 ft^{-1}
C = 0.1307 min^2/ft^5

S = 0.0001016
Sw = -0.06169
P = 1.5

Step Test Model: Jacob-Rorabaugh
Time (t) = 1. min Rate (Q) in cu. ft/min

$s(t) = -0.2762Q + 0.1307Q^{1.5}$
W.E. = -687.6% (Q from last step)



WELL TEST ANALYSIS

Data Set: C:\Users\cgardner\Documents\Florence Copper Project\AQTESOLV\R-07_O-05_draft.aqt
Date: 06/06/18 Time: 10:44:23

AQUIFER DATA

Saturated Thickness: 824. ft
Aquitard Thickness (b'): 1. ft
Anisotropy Ratio (Kz/Kr): 1.
Aquitard Thickness (b"): 1. ft

WELL DATA

Pumping Wells

Well Name	X (ft)	Y (ft)
R-07	847551.51	746129.73

Observation Wells

Well Name	X (ft)	Y (ft)
R-07	847551.51	746129.73
O-05	847692.91	745988.33

SOLUTION

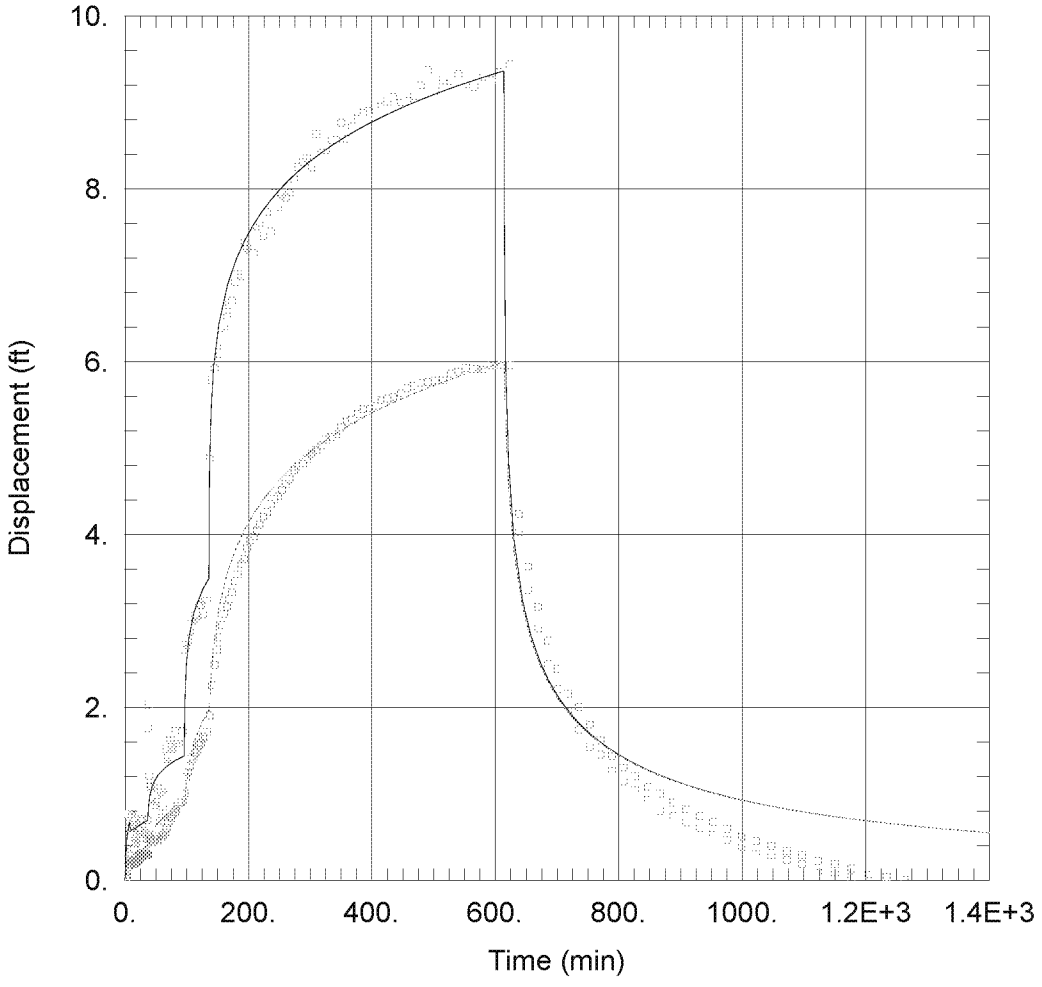
Aquifer Model: Leaky
Solution Method: Hantush-Jacob

T = 407.1 ft^2/day
1/B = 0.000438 ft^{-1}
C = 0.087 min^2/ft^5

S = 0.0001307
Sw = -5.363
P = 1.639

Step Test Model: Jacob-Rorabaugh
Time (t) = 1. min Rate (Q) in cu. ft/min

$s(t) = -0.1975Q + 0.087Q^{1.639}$
W.E. = 5474.% (Q from last step)



WELL TEST ANALYSIS

Data Set: C:\Users\cgardner\Documents\Florence Copper Project\AQTESOLV\R-07 _O-06_draft.aqt
Date: 06/06/18 Time: 10:44:04

AQUIFER DATA

Saturated Thickness: 824. ft
Aquitard Thickness (b'): 1. ft
Anisotropy Ratio (Kz/Kr): 1.
Aquitard Thickness (b"): 1. ft

WELL DATA

Pumping Wells

Well Name	X (ft)	Y (ft)
R-07	847551.51	746129.73

Observation Wells

Well Name	X (ft)	Y (ft)
R-07	847551.51	746129.73
O-06	847551.52	746200.44

SOLUTION

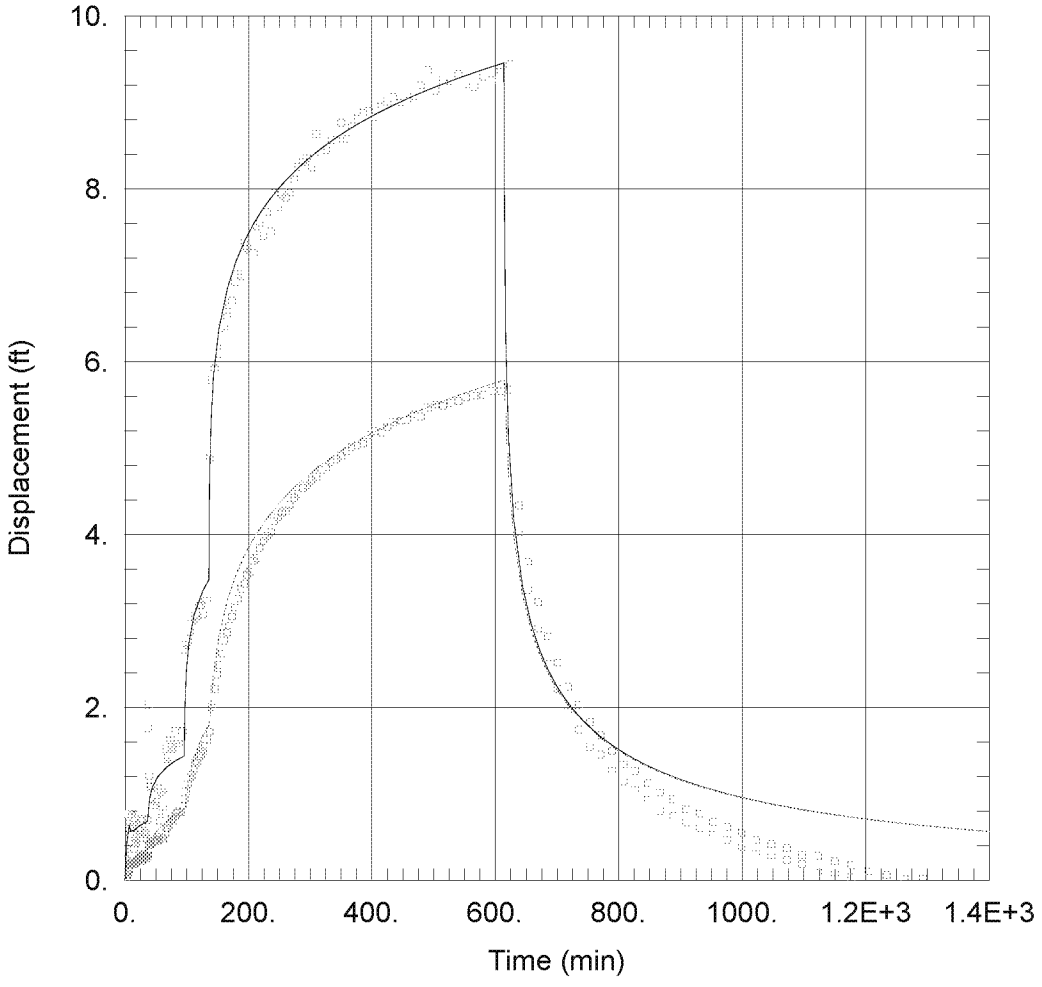
Aquifer Model: Leaky
Solution Method: Hantush-Jacob

T = 544.3 ft^2/day
1/B = 2.381E-5 ft^{-1}
C = 0.087 min^2/ft^5

S = 0.0005
Sw = -4.315
P = 1.639

Step Test Model: Jacob-Rorabaugh
Time (t) = 1. min Rate (Q) in cu. ft/min

$s(t) = 0.1263Q + 0.087Q^{1.639}$
W.E. = 517.7% (Q from last step)



WELL TEST ANALYSIS

Data Set: C:\Users\cgardner\Documents\Florence Copper Project\AQTESOLV\R-07_I-04_draft.aqt
Date: 06/06/18 Time: 10:44:13

AQUIFER DATA

Saturated Thickness: 824. ft
Aquitard Thickness (b'): 1. ft
Anisotropy Ratio (Kz/Kr): 1.
Aquitard Thickness (b"): 1. ft

WELL DATA

Pumping Wells

Well Name	X (ft)	Y (ft)
R-07	847551.51	746129.73

Observation Wells

Well Name	X (ft)	Y (ft)
R-07	847551.51	746129.73
I-04	847622.23	746129.75

SOLUTION

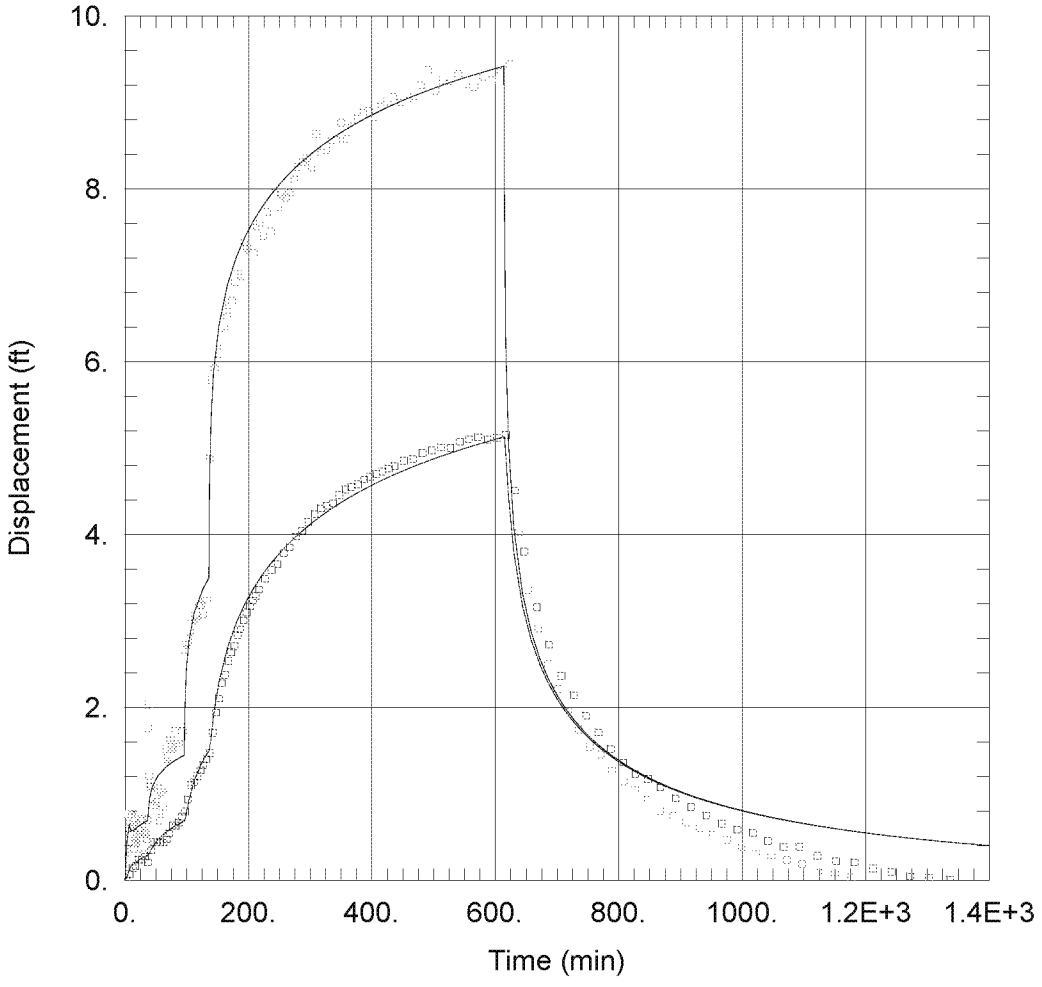
Aquifer Model: Leaky
Solution Method: Hantush-Jacob

T = 522.5 ft^2/day
1/B = 0.0001888 ft^{-1}
C = 0.087 min^2/ft^5

S = 0.0007522
Sw = -4.215
P = 1.639

Step Test Model: Jacob-Rorabaugh
Time (t) = 1. min Rate (Q) in cu. ft/min

$s(t) = 0.06785Q + 0.087Q^{1.639}$
W.E. = 604.9% (Q from last step)



WELL TEST ANALYSIS

Data Set: C:\Users\cgardner\Documents\Florence Copper Project\AQTESOLV\R-07_M57-O_draft.aqt
Date: 06/06/18 Time: 10:44:16

AQUIFER DATA

Saturated Thickness: 824. ft
Aquitard Thickness (b'): 1. ft
Anisotropy Ratio (Kz/Kr): 1.
Aquitard Thickness (b"): 1. ft

WELL DATA

Pumping Wells

Well Name	X (ft)	Y (ft)
R-07	847551.51	746129.73

Observation Wells

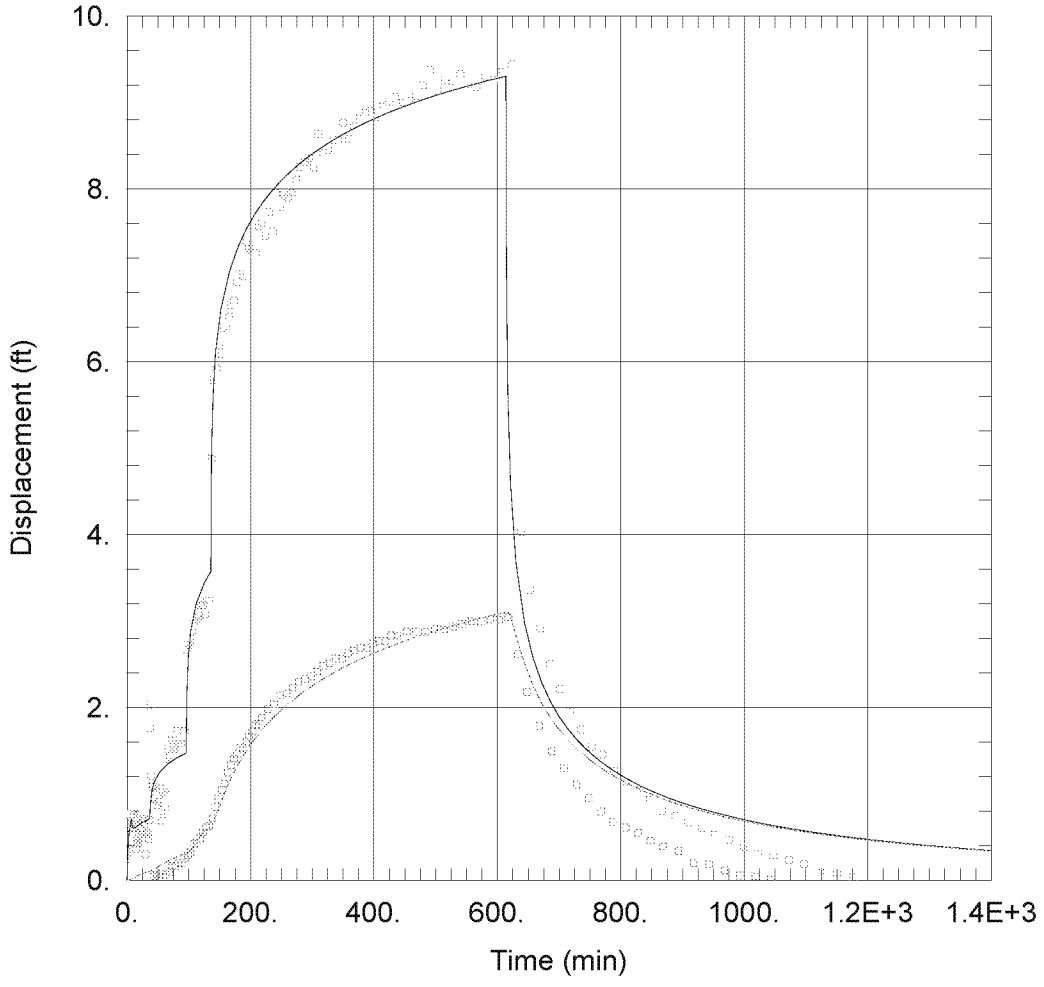
Well Name	X (ft)	Y (ft)
R-07	847551.51	746129.73
M57-O	847378	746249

SOLUTION

Aquifer Model: Leaky
Solution Method: Hantush-Jacob

T = 482.1 ft^2/day
1/B = 0.0003795 ft^{-1}
C = 0.087 min^2/ft^5
S = 0.0001123
Sw = -5.126
P = 1.639

Step Test Model: Jacob-Rorabaugh
Time (t) = 1. min Rate (Q) in cu. ft/min
$s(t) = 0.0575Q + 0.087Q^{1.639}$
W.E. = 813.7% (Q from last step)



WELL TEST ANALYSIS

Data Set: C:\Users\cgardner\Documents\Florence Copper Project\AQTESOLV\R-07_M60-O_draft.aqt
Date: 06/06/18 Time: 10:44:18

AQUIFER DATA

Saturated Thickness: 824. ft
Aquitard Thickness (b'): 1. ft
Anisotropy Ratio (Kz/Kr): 1.
Aquitard Thickness (b"): 1. ft

WELL DATA

Pumping Wells

Well Name	X (ft)	Y (ft)
R-07	847551.51	746129.73

Observation Wells

Well Name	X (ft)	Y (ft)
R-07	847551.51	746129.73
M60-O	847599	745904

SOLUTION

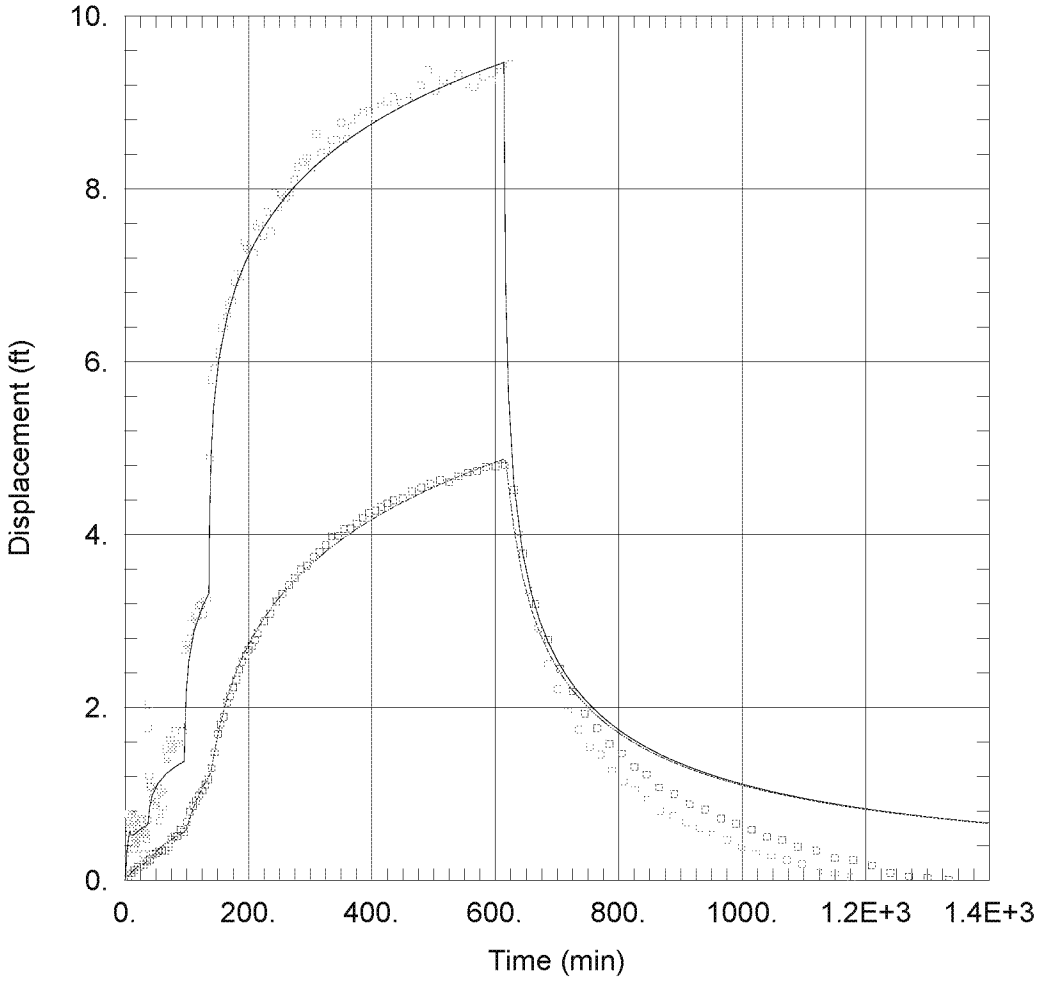
Aquifer Model: Leaky
Solution Method: Hantush-Jacob

T = 543.9 ft^2/day
1/B = 0.0007201 ft^{-1}
C = 0.087 min^2/ft^5

S = 0.000423
Sw = -4.315
P = 1.639

Step Test Model: Jacob-Rorabaugh
Time (t) = 1. min Rate (Q) in cu. ft/min

$s(t) = 0.1677Q + 0.087Q^{1.639}$
W.E. = 476.5% (Q from last step)



WELL TEST ANALYSIS

Data Set: C:\Users\cgardner\Documents\Florence Copper Project\AQTESOLV\R-07_MW-01-O_draft.aqt
Date: 06/06/18 Time: 10:44:20

AQUIFER DATA

Saturated Thickness: 824. ft
Aquitard Thickness (b'): 1. ft
Anisotropy Ratio (Kz/Kr): 1.
Aquitard Thickness (b"): 1. ft

WELL DATA

Pumping Wells

Well Name	X (ft)	Y (ft)
R-07	847551.51	746129.73

Observation Wells

Well Name	X (ft)	Y (ft)
R-07	847551.51	746129.73
MW-01-O	847846.92	746356.72

SOLUTION

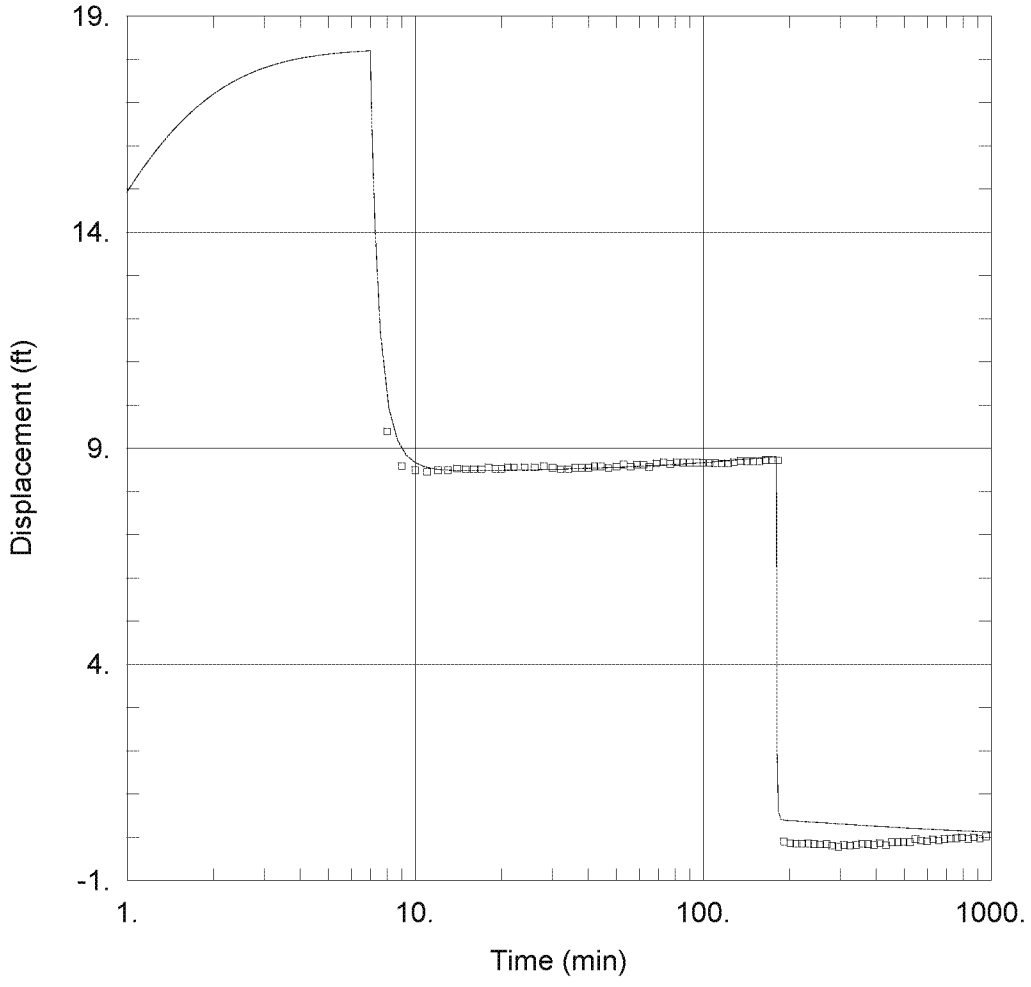
Aquifer Model: Leaky
Solution Method: Hantush-Jacob

T = 452.6 ft^2/day
1/B = 2.381E-5 ft^{-1}
C = 0.087 min^2/ft^5

S = 6.508E-5
Sw = -5.565
P = 1.639

Step Test Model: Jacob-Rorabaugh
Time (t) = 1. min Rate (Q) in cu. ft/min

$s(t) = -0.06722Q + 0.087Q^{1.639}$
W.E. = 1512.7% (Q from last step)



WELL TEST ANALYSIS

Data Set: C:\...\M55-UBF_single well_draft.aqt
Date: 07/23/18 Time: 08:51:03

AQUIFER DATA

Saturated Thickness: 39. ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA

Pumping Wells

Well Name	X (ft)	Y (ft)
M55-UBF	847541	746281

Observation Wells

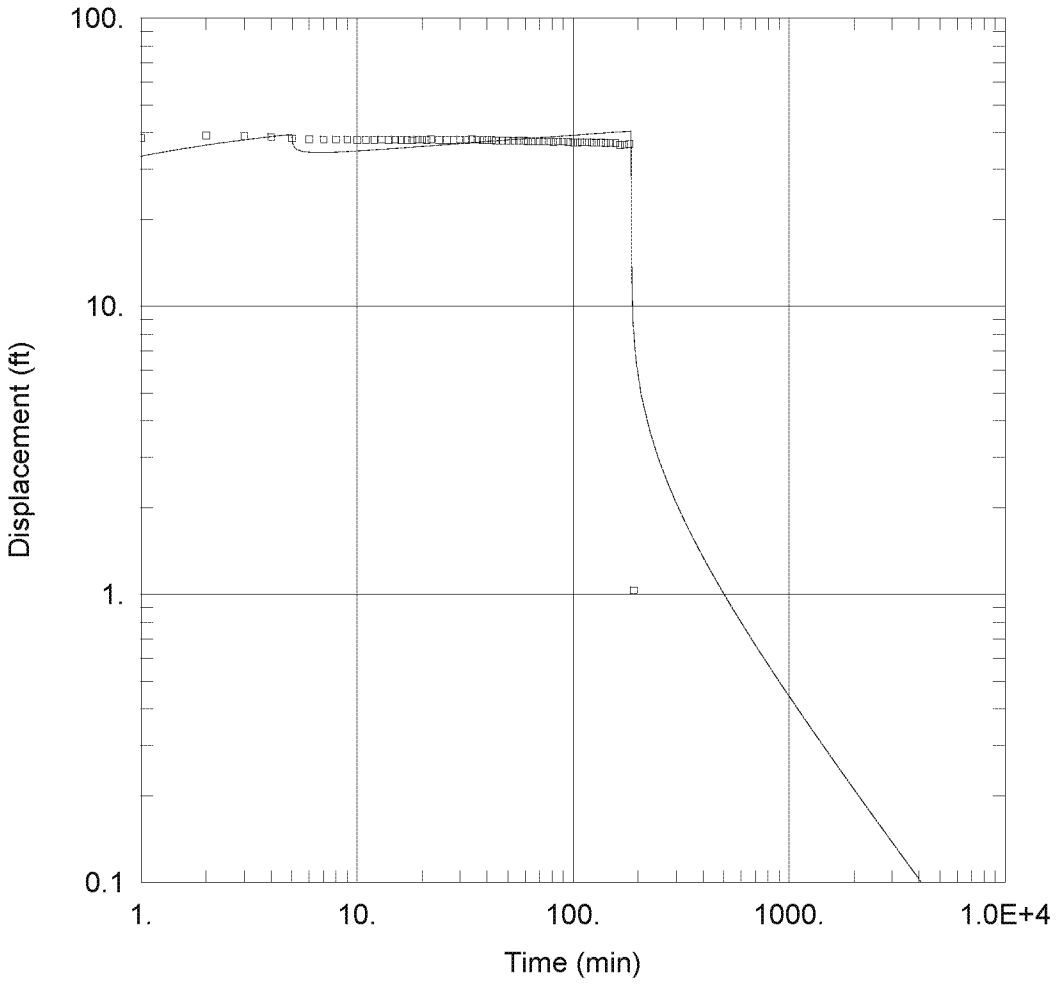
Well Name	X (ft)	Y (ft)
▫ M55-UBF	847541	746281

SOLUTION

Aquifer Model: Unconfined Solution Method: Moench

T = 482.5 ft^2/day
Sy = 0.13
Sw = 0.
r(c) = 0.21 ft

S = 0.001161
ß = 0.0001273
r(w) = 0.44 ft
alpha = 1.0E+30 min^{-1}



WELL TEST ANALYSIS

Data Set: C:\...\M56-LBF_single well_draft.aqt
Date: 07/23/18 Time: 08:51:21

WELL DATA

Pumping Wells

Well Name	X (ft)	Y (ft)
M56-LBF	0	0

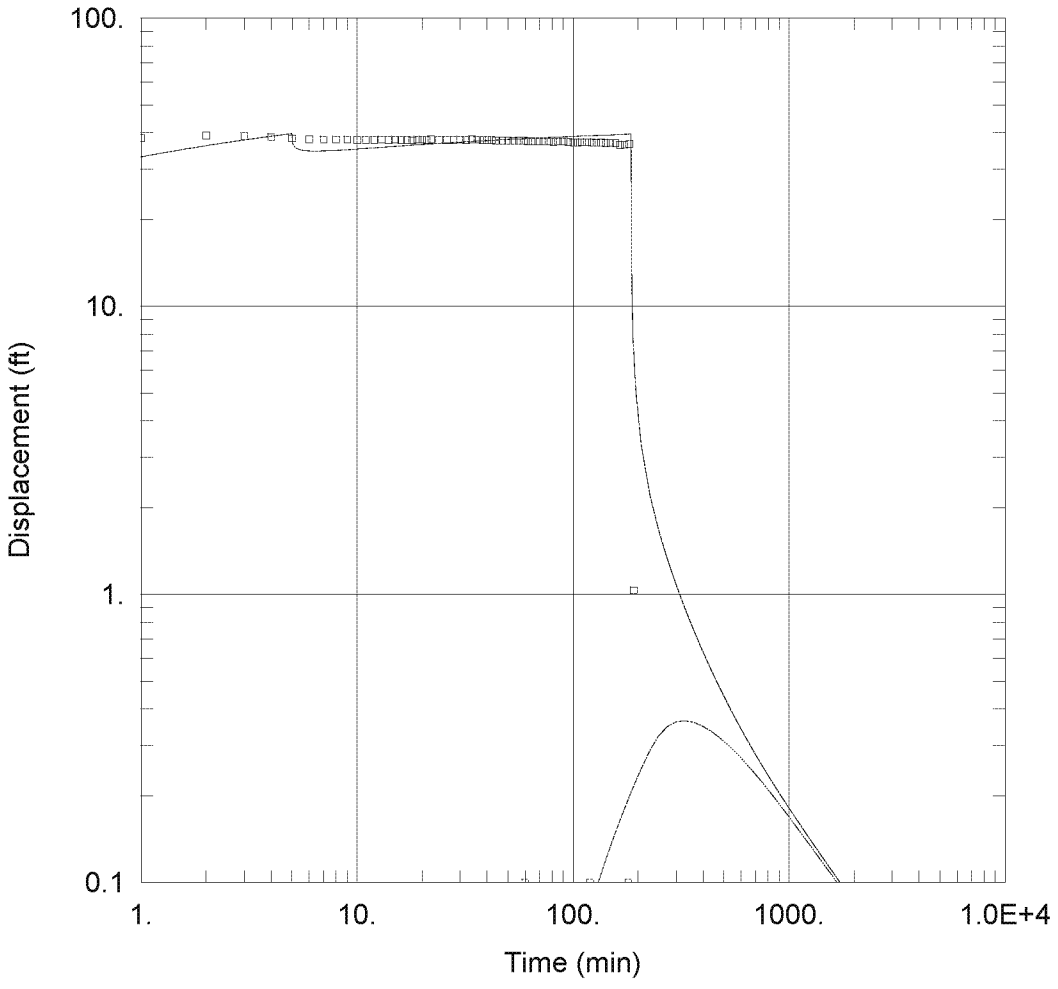
Observation Wells

Well Name	X (ft)	Y (ft)
M56-LBF	0	0

SOLUTION

Aquifer Model: Confined
Solution Method: Theis

T = 107.2 ft^2/day
S = 0.003208
Kz/Kr = 1.
b = 50. ft



WELL TEST ANALYSIS

Data Set: C:\...\M56-LBF_single well_draft_jc.aqt
Date: 07/23/18 Time: 09:27:25

WELL DATA

Pumping Wells

Well Name	X (ft)	Y (ft)
M56-LBF	0	0

Observation Wells

Well Name	X (ft)	Y (ft)
M56-LBF	0	0
O-06	109	0

SOLUTION

Aquifer Model: Confined
Solution Method: Theis

T = 264. ft^2/day
S = 0.003208
Kz/Kr = 0.1
b = 100. ft